Content available at: https://www.ipinnovative.com/open-access-journals

IP Journal of Nutrition, Metabolism and Health Science

Journal homepage: https://www.jnmhs.com/

Original Research Article

Assessment of dietary pattern of school going adolescents in rural and urban area of North Karnataka: A comparative study

Sweta Sinha [1,*], Manjula S Patil [1], Shubham Mohan Sharma [1], Ankit Pranjal [1], Tanvi Meha [1]

[1] *Dept. of Community Medicine, Jaipur National University, Jaipur, Rajasthan, India*

ARTICLE INFO

Article history:
Received 03-07-2023
Accepted 28-07-2023
Available online 08-09-2023

Keywords:
School
Adolescents
Rural and Urban
Dietary pattern

ABSTRACT

Background: Dietary habits of adolescents are considered as an important risk factor for several diet related diseases like obesity, diabetes, cardiovascular diseases etc. Inadequate nutrition during adolescence can have serious consequences throughout their reproductive years and beyond.
Objective : To assess and compare the dietary pattern of school going adolescents of rural and urban area.
Materials and Methods: An observational study was conducted among the school going adolescents (10-19 years) of age studying in government schools of rural and urban area. Information regarding their food habits and dietary intake were collected by direct interview method. Data was entered in MS Excel and analysed using SPSS version 22 and MS Excel. Statistical measures used were mean, standard deviation and Z-statistic. The statistical significance was evaluated at 95% confidence level and $p<0.05$ was considered significant.
Results: 83.33% from rural and 22.77% from urban area adolescents were consuming mixed diet. Green leafy vegetables were not consumed by 92 (25.56%) of the adolescents i.e. 37.22% in rural and 13.89% in urban area and it was statistically significant. The calorie intake among urban adolescent boys of 10-12 years was (1740.31 ± 219.04), 13-15years (1922.41 ± 240.19), 16-17years (2337.50 ± 17.68) kcal/day.
Conclusion: Calories and protein intake were inadequate in rural adolescents compared to urban area participants and significant statistical difference was noted.

1. Introduction

The word adolescence comes from the Latin word 'adolescere' meaning to grow and to mature. Adolescents are defined as the age group between 10-19 years according to WHO.[1] Adolescent's number has been doubled since 1950. At present the population of adolescent is 1.2 billion globally forming 18% of the total population.[2] Around 243 million are living in India and it consists of about 21% of Indian population,[3] Today, every 5^{th} person in India is an adolescent.[4] inadequate nutrition during adolescence can have serious consequences throughout reproductive years and beyond.

Dietary habits of adolescents are considered as an important risk factor for several diet- related diseases like obesity, diabetes, cardiovascular diseases etc. It affects their future health. They are more influenced by peers and media.[5] Studies have showed that they tend to skip breakfast, eat more meal outside house and eat more snacks which again affect their nutritional status.[6] Urban adolescents tend to enjoy soft drinks, potato chips, ready to eat meal, processed food.[7,8] There is also a decreased intake of fruits and vegetables and one of the increasing popularities of eating out.[9] Children tend to consume food high in fat and low in fibre when they eat outside. In

* *Corresponding author.*
E-mail address: shubhisharma1@gmail.com (S. Sinha).

https://doi.org/10.18231/j.ijnmhs.2023.022

rural area, people eat the same type of dishes based on traditional staple food. This nutrition transition has brought rapid change in the structure of Indian diet.

In India, significant epidemiological transformation has occurred over the past two to three decades, which has resulted an increase in the intake of fast food, carbonated beverages.[10] Most of the published literature focuses on dietary pattern among adolescents, while there is a paucity of information on dietary pattern of adolescents in both rural and urban area. Hence, the present study is designed to assess their dietary pattern of school going adolescents in rural and urban area. The objective of the study was to assess and compare the dietary habits and pattern of school going adolescents of rural and urban area.

2. Materials and Methods

This observational study was a part of a broader study as nutritional status of school going adolescents. The study was conducted among the school going adolescents (10-19 years) of age studying in Government schools in rural and urban field practice area (Uchagoan & Kashbag) of Department of Community Medicine, BIMS, Belagavi. There are 13 schools in Uchagoan and 9 schools in Kashbag. All Government schools were included in the sampling frame. Sample size was 360 taking prevalence of 19.44% of malnutrition in a previous Indian study with absolute error 5%, 10% response failure and 95% confidence interval.[11] Students from standard six to ten were included in the study and they were selected using simple random sampling technique.

A written permission from the authorities of all institutions was obtained prior to data collection. Consent from the study participant's parent/guardian was taken. A pre-designed semi-structured questionnaire was used to collect information regarding socio-demographic profile, food habits. Dietary intake was assessed using 24 hours recall method. Data was collected by using direct interview method. Questionnaire consists of socio-demographic profile, dietary history using 24 hours recall method and detailed history of dietary habits- type of diet, skipping breakfast, consuming mid-day meal, frequency of fruit, vegetables and green leafy vegetables consumption etc. Study duration was from January 2018 to March 2019. Ethical clearance was obtained from institutional ethical committee of BIMS, Belagavi.

2.1. Inclusion criteria

1. Students of both sexes between 10-19 years age group.
2. Willing to participate in the study.

2.2. Exclusion criteria

Who did not give informed written consent.

3. Statistical Analysis

Data entry was done in MS Excel and it was analysed using SPSS version 22 and MS Excel. Statistical measures used were mean, standard deviation and Z-statistic. The statistical significance was evaluated at 95% confidence level and $p<0.05$ was considered significant. Results were interpreted in tables and figures.

4. Results

360 adolescents participated in the study i.e. 180 from rural and urban area respectively.78.06% adolescents were consuming mixed diet (83.33% from rural and 22.77% from urban area). 12.77% of the adolescent added extra salt to their food which was more in rural area (16.11%) compared to urban area (9.44%). [Figure 1]. 90.28% of the participants preferred home prepared food (96.11% of rural and 84.44% of urban) and there was a significant statistical difference seen (Z-statistic & p-value 3.811&<0.01*). Lunch box was not brought by 57.78% of rural and 12.22% of urban adolescents on any of the days in the past week. The food items consumed in 24 hours by the school going adolescents were as follows. Majority (87.77%) had consumed chapatti / bhakhari (86.11% of rural and 89.44% of urban area), dal (95.28%). [Table 1]. There was a significant statistical difference seen in consumption of rice, dal/pulses, fast food and bakery items with p value <0.01. Maximum (55.56%) adolescents had never skipped breakfast any of the day in the past week but there was a significant statistical difference with *Z-statistic & p-value* of 3.0058 &<0.01*. [Table 2]. 54.72% of the study participants had consumed milk & its products only on 1-2 day/week. 33.61% of the adolescents had consumed fruits 2-3 days per week (23.33% rural and 43.89% urban area) and this difference was statistically significant (*Z-statistic & p-value* of 4.23053 &<0.01). Almost one fourth of the adolescents do not consume green leafy vegetables [Table 3]. Maximum (57.22%) adolescents had consumed carbonated drinks 1-2 day/week (43.89% of rural and 70.56% of urban area) and the difference was statistically significant. Fast food was consumed 1-2 day/week by 60.27% of them i.e. 47.78% rural and 72.78% urban area. [Table 4]. Calories and proteins were more deficit in rural adolescent boys and girls compared to urban adolescent boys and girls in all the age group and there was significant statistical difference observed. [Tables 5 and 6].

5. Discussion

In the present study, carbonated drinks were consumed on 1-2 day/week by 70.5% of adolescents in urban area which was higher compared to Fatima W et al., study in urban area (48.13%).[1] Fast food & bakery items were never consumed by 31.67% of adolescents in rural area and 3.89% in urban area whereas in Kansagara T et al. study, 23.9% in rural and 25.7% in urban never consumed fast food & bakery items.[5]

Table 1: Distribution of adolescents on basis of food items consumed during the last 24 hours. N=360.

Food items	Rural N (%)	Urban N (%)	Z statistics & p- value	Total N (%)
Chapati/Bhakhari	155 (86.11%)	161 (89.44%)	0.96564 &>0.05	316 (87.77%)
Rice	172 (95.55%)	158 (87.77%)	2.696308 &<0.01*	330 (91.67%)
Dal/pulses	178 (98.89%)	165 (91.67%)	3.277722 &<0.01*	343 (95.28%)
GLV	135 (75.0%)	121 (67.22%)	1.634433 &>0.05	256 (71.11%)
Vegetables	174 (96.67%)	170 (94.44%)	1.028016 &>0.05	344 (95.56%)
Fruits	17 (9.44%)	12 (6.67%)	0.966868 &>0.05	29 (8.06%)
Milk & its products	44 (24.44%)	59 (32.78%)	1.75819 &>0.05	103 (28.62%)
Egg	12 (6.67%)	13 (7.22%)	0.20526 &>0.05	25 (6.94%)
Meat/fish/chicken	3 (1.67%)	4 (2.22%)	0.3779 & >0.05	7 (1.94%)
Fast food & bakery items	17 (9.44%)	38 (21.11%)	3.11878 &<0.01*	55 (15.28%)

Table 2: Consumption of meals pattern among adolescents. N=360.

Consumption pattern		Skipped breakfast	Z statistic & P value	Brought lunch box	Z statistic & p value	Consumed mid-day meal	Zstatistic & P value
1day/week (N, %)	Rural	35 (19.44%)	0.13353 &>0.05	10 (05.56%)	0 &>0.05	10 (05.56%)	2.83937 &<0.01*
	Urban	36 (20.00%)		10 (05.56%)		26 (14.44%)	
	Total	71 (19.72%)		20 (05.56%)		36 (10.00%)	
2 -3 days/ week (N, %)	Rural	28 (15.56%)	0.83745 &>0.05	34 (18.89%)	0985035 &>0.05	9 (05.00%)	2.30609 &<0.05*
	Urban	34 (18.89%)		27 (15.00%)		21 (11.67%)	
	Total	62 (17.22%)		61 (16.94%)		30 (08.33%)	
>3 days/week (N, %)	Rural	03 (1.67%)	4.306 &<0.01*	32 (17.78%)	10.9561 &<0.01*	141 (78.33%)	9.643445 &<0.01*
	Urban	24 (13.33%)		121 (67.22%)		60 (33.33%)	
	Total	27 (07.50%)		153 (42.50%)		201 (55.83%)	
None of the days (N, %)	Rural	114 (63.33%)	3.0058 &<0.01*	104 (57.78%)	10.31416 &<0.01*	20 (11.11%)	6.77768 &<0.01*
	Urban	86 (47.78%)		22 (12.22%)		73 (40.56%)	
	Total	200 (55.56%)		126 (35.00%)		93 (25.83%)	

Table 3: Frequency of consumption of various food items among adolescents. N=360.

Intake Pattern		Milk & its products	Z statistic & P value	Fruits	Z statistic & P value	Green leafy vegetables	Z statistic & P value
1-2 days/ week	Rural	97 (53.88%)	0.43628 &>0.05	58 (32.22%)	0.11343 &>0.05	67 (37.22%)	1.71769 &>0.05
	Urban	98 (54.44%)		59 (32.78%)		83 (46.11%)	
	Total	197 (54.72%)		117(32.50%)		150 (41.67%)	
3-4 days/ week	Rural	41 (22.78%)	0.49407 &>0.05	42 (23.33%)	4.23053 &<0.01*	28 (15.56%)	4.23835 &<0.01*
	Urban	45 (25.00%)		79 (43.89%)		62 (34.44%)	
	Total	86 (23.89%)		121(33.61%)		90 (25.0%)	
5-6 days/ week	Rural	3 (1.67%)	3.88104 &<0.01*	31 (17.22%)	4.23053 &<0.01*	18 (10.00%)	1.57797 &>0.05
	Urban	21 (11.67%)		26 (14.44%)		10 (5.56%)	
	Total	24 (6.67%)		57 (15.83%)		28 (7.76%)	
None of the days	Rural	39 (21.67%)	5.475613 &<0.01*	49 (27.22%)	4.654958 &<0.01*	67 (37.22%)	5.266174 &<0.01*
	Urban	6 (3.33%)		16 (08.89%)		25 (13.89%)	
	Total	45 (12.50%)		65 (18.06%)		92 (25.56%)	

Table 4: Carbonated drinks and fast-food consumption pattern among adolescents. N=360.

Consumption Pattern		Carbonated drinks	Z statistic & P value	Fast foods & Bakery item	Z statistic & P value
Daily	Rural	5 (2.78%)	0.3401 &>0.05	7 (3.89%)	0.58677 &>0.05
	Urban	4 (2.22%)		5 (2.78%)	
	Total	9 (2.50%)		12 (3.33%)	
1-2 days/week	Rural	79 (43.89%)	5.31048 &<0.01*	86 (47.78%)	5.01331& <0.01*
	Urban	127 (70.56%)		131 (72.78%)	
	Total	206 (57.22%)		217 (60.27%)	
3-4 days/week	Rural	4(2.22%)	2.61766 &<0.01*	24 (13.33%)	0.45449 &>0.05
	Urban	15 (8.33%		27 (15.00%)	
	Total	19 (5.28%)		51 (14.16%)	
5-6 days/week	Rural	01 (0.56%)	2.96812 &<0.01*	6 (3.33%)	0.284 &>0.05
	Urban	11(6.11%)		7 (3.89%)	
	Total	11 (3.06%)		13 (3.61%)	
None of the day	Rural	91 (50.56%)	9.14437 &<0.01*	57 (31.67%)	7.398319 &<0.01*
	Urban	19 (10.56%)		7 (3.89%)	
	Total	110 (30.56%)		64 (17.78%)	
Infrequently/ Rarely	Rural	0 (0.00)	2.167& <0.05*	0(0.00)	1.74844 &>0.05
	Urban	4 (2.22%)		3(1.67%)	
	Total	4 (1.11%)		3(0.83%)	

Table 5: Comparison of mean calorie intake and deficient among rural and urban adolescent girls and boys (kcal/day). N=360.

Age in Years		Calorie Required(kcal/day)	Calorie Intake(Mean ± SD)	Calorie Deficient (%)	Z statistic & p-value
Adolescent girls					
10-12	Rural	2010	1167.33±168.55	842.67 (41.92%)	3.000518 &<0.01*
	Urban		1465.97±200.30	544.03 (27.07%)	
13-15	Rural	2330	1388.98±286.32	941.02 (40.39%)	2.199988 &<0.05*
	Urban		1644.87±300.26	685.16 (29.41%)	
16-17	Rural	2440	1389.87±310.59	1050.13(43.04%)	3.266596 &<0.01*
Adolescent boys					
10-12	Rural	2190	1260.30±139.42	929.70 (42.45%)	4.607218 &<0.01*
	Urban		1740.31±219.04	449.69 (20.53%)	
13-15	Rural	2750	1586.93±366.90	1163.07 (42.29%)	2.428118 &<0.01*
	Urban		1922.41±240.19	827.59 (30.09%)	
16-17	Rural	3020	1924.50±236.64	1095.50 (36.27%)	2.87808 &<0.01*
	Urban		2337.50±17.68	682.50 (22.60%)	

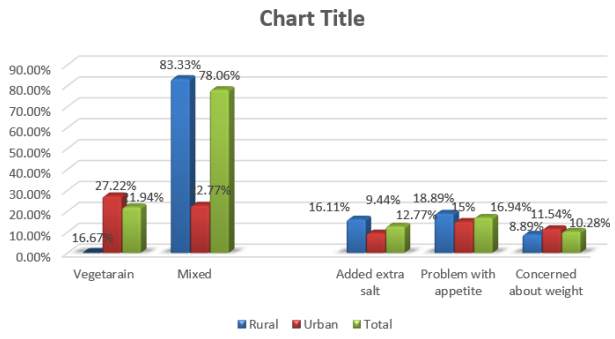

Fig. 1: Dietary pattern of adolescents. N= 360.

Breakfast was the most common meal which was missed by 3.33% in rural area and 8.33% in urban area adolescents where as in Shukla N K et.al study, 22.6% had skipped breakfast.[7]

96.11%adolescents from rural area and 84.44% from urban area preferred home prepared food because of socio-cultural factors. 10.56% adolescents in urban area preferred street food and 5.0% restaurant food compared to only 2.78% and 1.11% respectively in rural whereas in Das G et al. study (70%) of adolescents preferred home based food, followed by street food (22.67%) and (7.33%) restaurant food.[12] Prevalence of higher consumption of fast food and bakery items amongst urban area adolescents could be due to easy accessibility and availability of such food items and growing trend of eating outside.

Table 6: Comparison of mean protein intake and deficient among rural and urban adolescent girls and boys (gm/day). N=360.

Age in Years		Protein Required (gm/day)	Protein Intake(Mean ± SD)	ProteinDeficient (%)	Z statistic & p-value
Adolescent girls					
10-12	Rural	40.4	27.4 ± 4.43	13.0 (32.18%)	9.073856 &<0.01*
	Urban		39.99± 3.55	0.41 (1.01%)	
13-15	Rural	51.9	34.06 ± 7.50	17.84 (34.37%)	2.930729 &<0.01*
	Urban		41.14 ± 7.29	10.76 (20.73%)	
16-17	Rural	65.5	34.74 ± 7.83	30.76 (46.96%)	3.296747 &<0.01*
	Urban		45.66 ± 7.54	19. 84(30.29%)	
Adolescent boys					
10-12	Rural	39.9	31.92 ± 4.21	7.98 (20.0%)	2.968321 &<0.01*
	Urban		36.27 ± 2.87	3.63 (9.10%)	
13-15	Rural	54.3	40.27 ± 8.90	14.03 (25.84%)	2.805597 &<0.01*
	Urban		46.62 ± 5.50	7.68 (14.14%)	
16-17	Rural	61.5	45.63 ± 6.37	15.87 (25.80%)	4.199477 &<0.01*
	Urban		55.75 ± 3.61	5.75 (9.35%)	

41.67% participants from urban area had consumed green leafy vegetables 1-2 days/week which was higher than Chauhan N et al. study where the consumption of green leafy vegetables was 33.6%.[13] Lunch box was not brought by 57.78% of rural and 12.22% of urban adolescents on any of the days in the past week. The higher number of adolescents from rural area did not bring lunch box to the school as their home was nearby to visit during the lunch hours whereas in Bhargava M et al. 53.5% did not bring lunch box to school and they consumed lunch in school canteen.[14] Mid-day meal was not consumed on any of the day by 11.11% of adolescents in rural area compared to 40.56% urban area which was almost similar to Bhargava M et al. study in Uttarakhand (10.4%).[14]

The calorie intake among urban adolescent boys of 10-12 years was (1740.31 ± 219.04), 13-15years (1922.41 ± 240.19), 16-17years (2337.50 ± 17.68) kcal/day. In Shafiee S et al. study among urban adolescent boy's calorie intake for 10-12 years age group was (1352.07±817.96), 13-15 years (1502.52±698.38) and for 16-17 years (1539.77±697.77).[15] Among adolescent girls in rural area, protein intake in 10-12 years was (27.4 ± 4.43) gm/day, 13-15 years (34.06 ± 7.50) gm/day and 16-17 years (34.74 ± 7.83) gm/day. In Baliga SS et al. study among rural girls, protein intake for 10-12 years age group was (39.18±2.55), 13-15 years (42.27±2.46) and for 16-17 years (44.13±2.77) gm/day.[16]

6. Conclusion

Calories and protein intake were inadequate in rural adolescents by more than one fourth compared to urban area adolescents. There was a significant difference in consumption of carbonated drinks and fast food & bakery items between rural and urban adolescents. This may be because of easy accessibility of these items in urban area. The influence of mass media on consumption of food items amongst this age group has increased. Government can utilize the mass media as a tool for promoting the intake of nutritious food.

7. Recommandations

Adolescents must be educated at school level about the importance of regular intake of healthy nutritious food and harmful effects of non-nutritious food. Counseling services of adolescents to be included in all schools.

8. Limitations

Except for calories and protein intake, further analysis of dietary intake was not carried out. Detailed analysis like biochemical assessment (e.g. serum iron) would have given more complete picture of nutritional status of adolescents. It is also difficult to assess the dietary intake by 24 hours recall method.

9. Ethical Approval

The study was approved by the Institutional Ethics Committee of BIMS, Belagavi

10. Source of Funding

None.

11. Conflict of Interest

None.

Acknowledgments

Authors gratefully acknowledge the participants, coordinators and Dr. R. G. Viveki, Head of the department

of Community Medicine, BIMS, Belagavi for assistance and support.

References

1. Fatima W, Alqhatani N, Ahmad L. Assessment of Nutritional Status and its Related Factors among Female Adolescent Girls: A School based Study in Arar city, Kingdom of Saudi Arabia. *Int J Med Res Health Sci*. 2019;8(2):133–44.
2. World Health Organization. 2019. Child and Adolescents Health and Development. Available from: https://searo.who.in.
3. World Health Organization. 2019. Data on maternal, newborn, child and adolescent health. Available from: https://www.who.int.
4. Unicef -2019. Adolescent statistics. Available from: https://data.unicef.org.
5. Karasangra T, Parmar DV, Chauhan M, Dave P. A study on dietary intake among school going adolescent girls in rural and urban area of Jamnagar District. *Int J Med Sci Pub Health*. 2018;7(11):1. doi:10.5455/ijmsph.2018.0412921052018.
6. St-Onge MP, Ard J, Basin ML, Chiuve SE, Johnson HM, Vardy K. American Heart Association Obesity Committee Council on Lifestyle and Cardiometabolic Health; Council on Cardiovascular Disease in the Young; Council on Clinical American Heart Association Cardiology; Stroke Council. Meal Timing and Frequency: A scientific statement from. *Am Heart Assoc*. 2017;135(9):96–121.
7. Shukla NK, Shukla M, Ahmed S, Shukla R. A Preliminary Study on Eating Habits among School Going Adolescent Girls in Barabanki District. *Uttar Pradesh Sch J App Med Sci*. 2017;5(1C):184–7.
8. Elsabagh HM, Soliman FE, Hassan L. Perception and practices of healthy lifestyle in late adolescence and its impact on body mass index. *Nat J Commun Med*. 2016;7(4):311–9.
9. Matthews VL, Wien M, Sabaté J. The risk of child and adolescent overweight is related to types of food consumed. *Nutr J*. 2011;10(71):1–7. doi:10.1186/1475-2891-10-71.
10. Dietary guidelines for Indians-A manual. National Institute of Nutrition; Hyderabad; 2011. Available from: https://www.nin.res.in/downloads/DietaryGuidelinesforNINwebsite.pdf.
11. Rajaretnam T, Hallad SJ. Nutritional status of adolescents In Northern Karnataka. *The J Fam Welf*. 2012;58(1):55–67.
12. Das G, Pathania R, Das G. Assessment of dietary pattern of adolescents in Himachal Pradesh in India. *J Paramed Sci*. 2016;7(3):1–7.
13. Chauhan N, Saini SK, Dass K. Lifestyle of adolescent girls living in Dadu Majra Colony. *Nurs Midwif Res J*. 2014;10(1):36–46.
14. Bhargava M, Kadpal SD, Aggarwal P, Sati H. A comparative study of mid-day meal beneficiaries and private school attendees. *Indian J Commun Health*. 2014;26(2):223–7.
15. Shafiee S, Mesgarani M, Begum K. Assessment of nutritional status among adolescent boys in an urban population of South India. *Glob J Health Sci*. 2015;7(3):335–44.
16. Baliga SS, Naik VA, Mallapur MD. Nutritional status of adolescent girls residing in rural area: A community-based cross-sectional study. *J Sci Soc*. 2014;41(1):22–5.

Author biography

Sweta Sinha, Assistant Professor https://orcid.org/0000-0003-1090-8068

Manjula S Patil, Assistant Professor

Shubham Mohan Sharma, Associate Professor

Ankit Pranjal, Senior Resident

Tanvi Meha, Assistant Professor

Cite this article: Sinha S, Patil MS, Sharma SM, Pranjal A, Meha T. Assessment of dietary pattern of school going adolescents in rural and urban area of North Karnataka: A comparative study. *IP J Nutr Metab Health Sci* 2023;6(3):130-135.