

Original Research Article

A comparative study on bowel habits among the rural and urban school going adolescents of Puducherry

Shiyam V.¹, Nishanthini N.^{1*}, Niranjjan R.², Lokeshmaran A.³

¹Department of Community Medicine, Aarupadai Veedu Medical College and Hospital, Puducherry, India

²Department of Community Medicine, Vinayaka Missions Medical College, Karaikal, Puducherry, India

³Department of Community Medicine, Mahatma Gandhi Medical College Hospital and Research Institute, Puducherry, India

Received: 30 September 2020

Accepted: 13 October 2020

*Correspondence:

Dr. Nishanthini N.,

E-mail: drnishaanbu@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Adolescence stage the most challenging periods and critical period in one's life. Bowel habit an important process in day to day life which also shows changes in its pattern from daily life. These changes need to be evaluated for the cause and to prevent certain diseases involving colon and rectum. Objectives was to determine and compare the bowel habits among school going adolescents in rural and urban areas of Puducherry.

Methods: A cross sectional study was conducted from Jun 2019 to Aug 2019. School students from 6th to 12th standard were selected by multistage random sampling method. A semi structured self-administered questionnaire was used to collect the data. Data were analyzed by SPSS version 20.

Results: A cross sectional school-based study was conducted among 1350 school going adolescence, among them 618 students from rural area and 732 students from urban area participated in the study. Prevalence of constipation was higher among school going adolescents of urban area (21.9%) compared to that of rural area (19.2%). Prevalence of diarrhoea was higher among the school going adolescents of rural area (6.2%) compared to that of urban area (4.1%). Open field defaecation practice was high among the rural adolescents (26.9%) compared to that of urban adolescents (7.4%). Type 3 stool form was the predominant type in both rural (50.03%) and urban (51.8%) school which is the normal stool form in bristol stool chart.

Conclusions: Total 87.2% of rural and 87% of urban school going adolescents have a normal bowel habit. Open field defaecation practice was high among the rural adolescents compared to that of urban adolescents.

Keywords: Bowel habits, School going adolescents, Bristol stool chart, Rome III criteria

INTRODUCTION

Adolescence stage the most challenging periods and critical period in one's life. Adolescence is the crucial times where they learn to be an independent person, develop behavioural changes, inculcate social skills, and accept new relationships which will last for the rest of their lives. During this transition from childhood to adulthood adolescents undergo a wide range of health risk starting from physical to mental health. World health

organization (WHO) report says that about 1.2 billion people are living in the adolescent age group of 10 to 19 years.¹ Adolescence are often considered to be neglected group in the continuum of care in health care system. Also, to achieve universal health coverage, a core component of 2030 agenda for sustainable development, attention has to be given to this neglected group of adolescence.²

During this transitional stage adolescent children face various problems including the development of

reproductive system and sexual maturation.^{3,4} Bowel habit an important process in day to day life which also shows changes in its pattern from daily life. These changes need to be evaluated for the cause and to prevent certain diseases involving colon and rectum.⁵ Several factors like dietary habit, quantity of fibre intake, gut transit time influences the bowel habit of different population.^{6,7} Interestingly, several investigators have found an association between diet and bowel habits particularly in developed countries.⁷⁻⁹ The studies about the bowel habits can be used to determine the lower gastrointestinal disorder and also to regularise the bowel habits by educating the students about good sanitary practices, life style and dietary modifications.¹⁰

Though a wide range of studies are done in various parts of the country with regards to bowel habits and their mutual association in different age group, their comparison among rural and urban school going adolescents is very limited. Hence this study was carried out with an objective to determine and compare the bowel habits among school going adolescents in rural and urban areas of Puducherry.

METHODS

A school based cross sectional study was conducted in selected rural and urban area over a period of three months from May 2019 to October 2019. Participants for the study were selected by multistage random sampling method. Puducherry district is divided into seven administrative zones which formed the first stage unit.

Two zones (one in urban zone and one in rural zone) were selected by simple random sampling which formed the second stage unit. Each higher secondary school formed a cluster; totally there were 36 higher secondary schools in urban area and 16 higher secondary schools in rural area which includes both government and private schools. Totally 4 schools (clusters) comprising of one private and one government school each from rural and urban area were selected randomly from the cluster which is the final stage units of the sampling method. (Figure 1) All the students from 6th to 12th standard enrolled in the selected Schools were included in the study. Students who were absent on the day of data collection, Child of the parents who were not willing to give consent and Children who were not feeling well on the day of study were excluded from the study.

Data collection tool

A semi structured self-designed and self-administered questionnaire was used to collect the data from the students who are satisfying the inclusion criteria. The questionnaire was used after conducting face validity and pilot testing. After getting permission from the Principal and the teachers of the school the investigator distributed and briefed about the questionnaire to the students. Their doubts regarding the questionnaire were also clarified prior to the filling of the questionnaire. Sufficient time was given to fill the questionnaire and the filled questionnaire was collected and checked by the investigator for the completeness of the response given by the students.

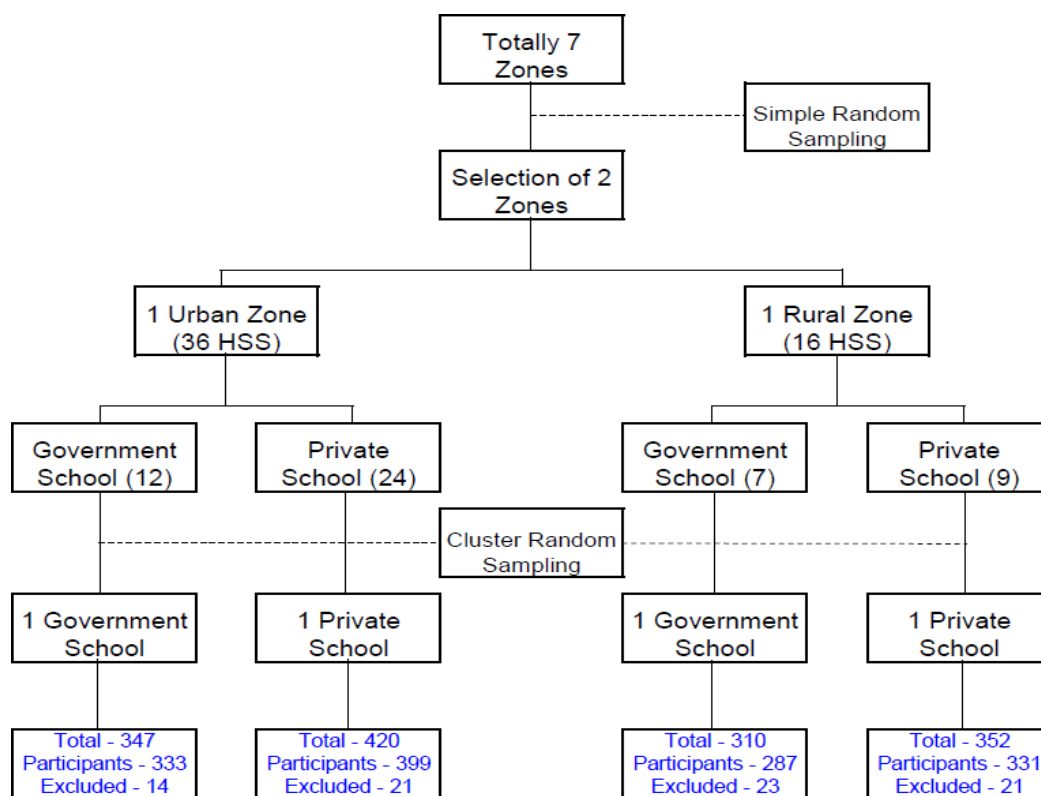


Figure 1: The selection of study participants.

The questionnaire consists of three parts: first part of the questionnaire consists of socio demographic details like age, gender, education and family type. Second part of the questionnaire consist of questions regarding practice for defecation, restraining from using school toilets for defecation, how often they pass stools etc. Third part of the questionnaire consists of ROME III criteria (sensation of obstruction and manual manoeuvre– 4th and 5th criteria were excluded after pilot testing) for functional constipation, WHO definition for diarrhoea and Bristol stool chart to assess bowel habits.¹¹

Statistical analysis

Data was entered and cleaned in excel sheet. Analysis was done using SPSS version 20. All data were expressed in percentages. Difference between two proportions was analysed using Chi-square test. Level of significance was set at p value <0.05 .

Ethical clearance

The study was started after getting the ethical clearance from institutional ethical committee. Prior permission was obtained from the department of education and also from the Principal of the concerned school. Informed consent was obtained from all the participants above 18 years of age. For the participants' below 18 years, assent was obtained in addition to the consent from their parents prior to the start of study. This study is a part of the Indian council of medical research (ICMR) study.

RESULTS

A cross sectional school-based study was conducted among the 1429 students in all the four schools, 1350 students were involved in the study who fulfilled the inclusion criteria. Rest 79 students were excluded from the study. 618 students from rural area and 732 students from urban area participated in the study.

Table 1 shows the socio demographic details of the School going adolescents among rural and urban area. In both rural and urban area majority of the participants

were above 15 years of age 413 (66.8%) and 539(73.6%) respectively. A significant difference was seen for age among the rural and urban school going adolescents. Based on gender distribution males were 60.2% and the females were 39.8% in rural schools whereas males were 52% and females were 48% in urban schools. A significant difference was seen among the school going adolescents of rural and urban area for gender. In both rural and urban area nuclear type of family was common with 68.8% and 69.5% respectively for family type. The predominant religion was Hindu in both rural and urban with a percentage of about 96.6% and 95.9% respectively. A homogeneous distribution of school going adolescents were seen for both the group based on family type and religion.

Table 2 shows the bowel habits among rural and urban school going adolescents. Usage of latrine for defaecation was found to be higher among both the rural and urban schools with a percentage of 66.5 and 90.3 respectively and a significant difference was observed among the two groups of rural and urban schools. Open air defaecation was practiced in both groups but the usage rate was higher among rural School going adolescents (26.9%) compared to urban school students (7.4%). Restraining of school toilets was higher among rural School going adolescents than urban School going adolescents which were 45.3% and 29% respectively. Among the students who are restraining school toilet the main reason was by the rural school students were a smaller number of toilet (18.4%) followed by unhygienic toilets (13.3%) and no water (7.3%) whereas for urban school dirty toilet (12.7%) was the main reason followed by unhygienic (5.7%). About 94.8% students in the rural school and 99.2% students in urban schools do not follow any alternate method for defaecation during the school hours, rest of the students have an alternate method like using house near the school or going home. 95.1% and 88.7% children in rural school and urban school respectively pass the stools in the morning. Among the School going adolescents who do not pass the stools in the morning 2.6% in rural school pass the stools in the evening whereas 11.3% urban school students pass the stools at night.

Table 1: The socio demographic details of the school going adolescents among rural and urban area.

Socio demography		School region		Chi square value	P value
		Rural N (%) (n=618)	Urban N (%) (n=732)		
Age	<15 years	413 (66.8)	539 (73.6)	7.465	0.007
	>15 years	205 (33.2)	193 (26.4)		
Gender	Male	372 (60.2)	381 (52)	9.013	0.003
	Female	246 (39.8)	351 (48)		
Family type	Nuclear	425 (68.8)	509 (69.5)	5.859	0.05
	Joint	168 (27.2)	174 (23.8)		
	Extended	25 (4)	49 (6.7)		
Religion	Hindu	594 (96.6)	702 (95.9)	0.583	0.74
	Christian	17 (28)	23 (3.1)		
	Muslim	4 (0.6)	7 (1)		

Table 2: Bowel habits among rural and urban school going adolescents (n=1350).

Bowel Habits		School Region		Chi- square value	P value
		Rural (n=618) N (%)	Urban (n=732) N (%)		
Defaecation Method	Open	166 (26.9)	54 (7.4)	116.455	0
	Both	41 (6.6)	17 (2.3)		
	Latrine	411 (66.5)	661 (90.3)		
Restraining of school toilet	No	338 (54.7)	520 (71)	38.653	0
	Yes	280 (45.3)	212 (29)		
Reason for restraining from using school toilet	NA	338 (54.7)	520 (71)	182.013	0
	Less number of toilets	114 (18.4)	10 (1.4)		
	No water	45 (7.3)	32 (4.4)		
	Dirty	24 (3.9)	93 (12.7)		
	Unhygienic	82 (13.3)	42 (5.7)		
	Uncomfortable	9 (1.5)	16 (2.2)		
	No lock	6 (1)	19 (2.6)		
Any Alternate Method during school hours	No	586 (94.8)	726 (99.2)	23.268	0
	Yes	32 (5.2)	6 (0.8)		
Passing of stool in the morning	No	30 (4.9)	83 (11.3)	18.371	0
	Yes	588 (95.1)	649 (88.7)		
If not in the morning	No	588 (95.1)	649 (88.7)	58.884	0
	Evening	16 (2.6)	0 (0)		
	Night	14 (2.3)	83 (11.3)		
Abdominal pain	No	477 (77.2)	546 (74.6)	1.229	0.268
	Yes	141 (22.8)	186 (25.4)		
Frequency of passing of stool/day	Once	393 (63.6)	516 (70.5)	9.22	0.009
	Twice	185(29.9)	166(22.7)		
	Thrice or more	40(6.5)	50 (6.8)		

Table 3: Bowel habits among rural and urban school going adolescents based on ROME III criteria (n=1350).

Bowel habits		Rural (n=618) N (%)	Urban (n=732) N (%)	Chi- square value	P value
Straining of stools	No	496 (80.3)	572 (78.1)	0.909	0.34
	Yes	122 (19.7)	160 (21.9)		
Incomplete Evacuation	No	535 (86.6)	615 (84)	1.731	0.188
	Yes	83 (13.4)	117 (16)		
Stool frequency per week	Daily	567 (91.7)	671 (91.7)	0.509	0.775
	Two days once	39 (6.3)	43 (5.9)		
	Three days once	12 (1.9)	18 (2.5)		

Table 3 shows the bowel habits among rural and urban School going adolescents based on ROME III criteria. Straining of stool was seen in 19.7% of children in rural school and 21.9% children in urban school. Incomplete evacuation was seen in 13.4% children in rural school and 16% children in urban school. There was no statistically significant association seen between the school going adolescents of rural and urban area for straining of stools, incomplete evacuation and stool frequency per week. Figure 2 shows the type of stool form among rural and urban school students. Type 3 stool form was the

predominant type in both rural (50.03%) and urban (51.8%) school which is the normal stool form. Followed by type 3 stool form, type 2 stool form was common among the School going adolescents of rural and urban area accounting for 24.3% and 32% which indicates that students have moderate constipation. Type 4 stool form was the third most common stool form for both rural and urban school going adolescents contributing to 10% and 9.7% respectively. Type 6 and 7 stool form means diarrhoea which was the least common stool form in both among rural School going adolescents (3.7% and 2.1%)

and urban School going adolescents (0.9% and 0.4%). The chi square value was 38.451 and the p value was 0.00000 which was less than 0.05. A statistically

significant association was seen for stool form based on Bristol stool chart among rural and urban school going adolescents.

Table 4: Distribution of constipation and diarrhoea among rural and urban school going adolescents based on various criteria (n=1350).

Diarrhoea/constipation	No/Yes	Rural N (%) (n=618)	Urban N (%) (n= 738)	Chi square value	P value
Based on WHO criteria					
Diarrhoea	No	578(93.5)	682(93.2)	0.06	0.79
	Yes	40(6.5)	50(6.8)		
Based on ROME III criteria					
Functional constipation	No	561(90.8)	672(91.8)	0.446	0.5
	Yes	57(9.2)	60(8.2)		
Based on Bristol stool chart					
Diarrhoea	No	582(94.17)	722(98.63)	18.99	0
	Yes	36(5.82)	10(1.37)		
Constipation	No	438(70.9)	472(64.5)	6.2	0.01
	Yes	180(29.1)	260(35.5)		

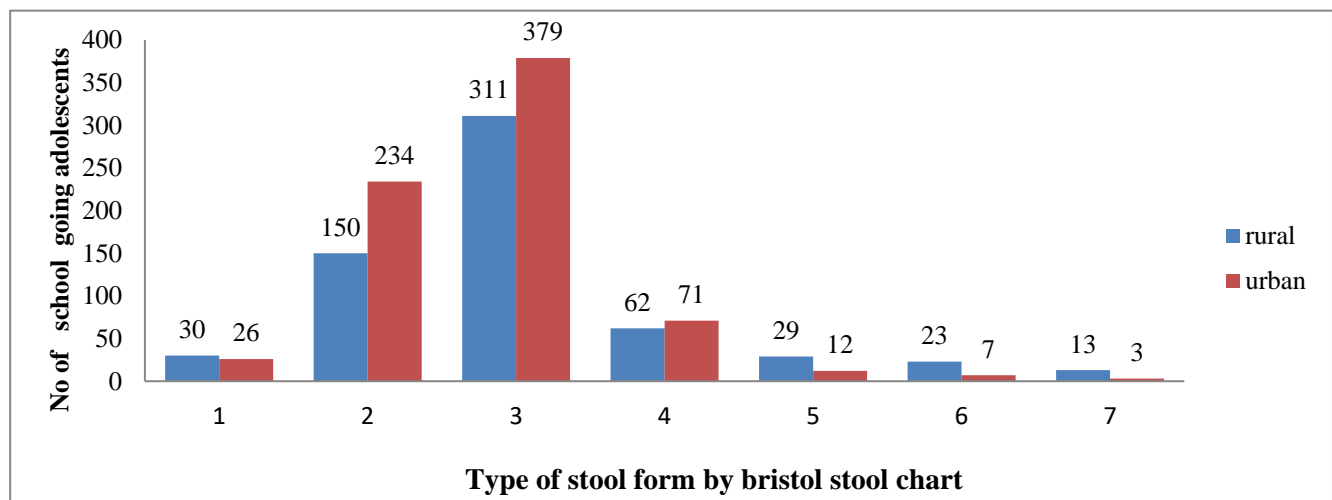


Figure 2: The type of stool form in Bristol stool chart among rural and urban school adolescents (n=1350).

Table 4 shows the pattern of Bowel habits based on various criteria among rural and urban school going adolescents. Based on WHO criteria for diarrhoea school going adolescents of rural area (6.5%) have prevalence slightly lower than the school going adolescents of urban area (6.8%). In both the groups normal bowel habit was about 93%. There was no significant difference among the children of rural and urban school going adolescents. Based on ROME III criteria for constipation, the prevalence was higher in rural students (9.2%) compared to that of urban students who had 8.2%. There was no significant difference among the children of rural schools and urban schools. Based on Bristol stool chart, Diarrhoea was higher among the rural school children than urban school children which were 5.82% and 1.37%. But constipation was much higher among the school going adolescents of urban area compared to that of school going adolescents of rural area which was 35.5% and 29.1%. Overall prevalence of constipation (25.1%)

was higher compared to that of the prevalence of diarrhoea (3.4%) in both rural and urban school children. A significant difference was seen for diarrhoea and constipation among rural and urban school students based on Bristol stool chart with a p value of 0 and 0.01 respectively.

About 87.2% of rural and 87% of urban school going adolescents have a regular bowel habit. Prevalence of constipation was higher among school going adolescents of urban area (21.9%) compared to that of rural area (19.2%). Prevalence of diarrhoea was higher among the school going adolescents of rural area (6.2%) compared to that of urban area (4.1%). The prevalence of constipation was higher than the prevalence of diarrhoea.

DISCUSSION

A school based cross sectional study was conducted among the 1350 school going adolescents. Among the

study participants 618 students were from rural school and 732 students were from urban school. Among these study subjects 597 were females and 753 were males. 610 students were from government school and 630 students were from private schools.

A bowel habit varies from place to place across the world and it is difficult to study as a matter of privacy. Stool frequency of 3-21 per week is considered normal. Above 21 stools per week is diarrhoea and below 3 stools per week is constipation.¹² Bowel habit is also an important sanitary marker for a nation.

In our study restraining from using school toilet was about 45.4% among rural school which was higher than restraining from the usage of school toilet among urban school which was only 29%. In a comparative study conducted by Sujatha B et al among 6-12 years of normal bowel habits children and 2-5 years functional constipation group 59.9% school going children belonging to normal bowel habits reported to have an aversion in using the school toilet which was higher than that of our study. The reason could be the difference in the age group where we studied the bowel habits of adolescents but the study by Sujatha et al included the children from 6 to 12 years of age. But this retentive behaviour of the children may lead to a wide variety of bowel problems like Irritable bowel syndrome, colorectal carcinoma etc.¹³

In our study about 23% of the student reported abdominal pain whereas study conducted by Kondapalli et al showed about 30% of the children were complaining about recurrent abdominal pain.¹⁴ But this was in contrast to the study conducted by sujatha B et al where the recurrent abdominal pain was only 5.9%.¹³

In our study the stool frequency with less than 3 per week was 97.2% but, in a study, conducted by Kondapalli et al only 80% of the children had a stool frequency of less than 3 per week.¹⁴

In our study the predominant stool form was type 3 among school going adolescents of rural and urban area which was similar to the study conducted by Kondapalli CS et al where the common stool form was type 3 about 51.4%.¹⁴ But this was in contrast to a study conducted by Sujatha B et al where the commonest stool form was type 4. But this study was conducted among the children of 2-12 years.¹³ Both type 3 and type 4 were considered normal stool form as per Bristol stool chart. Sajitha et al in a hospital-based study among the adults of 17 to 25 years has also found the predominant stool type as type 3 stool form.¹⁰ In our study the majority of the students had normal stool form.

CONCLUSION

From this study we conclude that about 87.2% of rural and 87% of urban school going adolescents have a normal

bowel habit. Rest of the students have either diarrhoea or constipation. Among them the prevalence of constipation was higher in both the groups compared to that of diarrhoea. But prevalence of constipation was higher among the school going adolescents of urban area compared to that of the school going adolescents of rural area. But open field defaecation practice was high among the rural adolescents (26.9%) compared to that of urban adolescents (7.4%). Improvising the sanitation in schools can improve the bowel habits. In our study constipation remains to be higher among both rural and urban school going adolescents which is remaining unnoticed by the children. Educate and motivate the students to avoid open field defaecation and hygienic sanitary practices can be nurtured in the schools. The students can be a part of the community in helping the nation to achieve the 6th goal of SDG (target 6.2 seeks to achieve access for all to sanitation and hygiene).

Recommendations

Though we have studied the bowel habits of the school going adolescents of rural and urban area we could have explored the factors influencing the bowel habits. In depth interview and focus group discussion can be conducted in future to explore the factors influencing the bowel habits.

ACKNOWLEDGEMENTS

We are greatly thankful to the Indian Council of Medical Research for selecting and motivating to conduct the study. We also thank the Director of Department of Education, Puducherry for giving us the permission to conduct the study. We thank the Principal and the teachers for their cooperation for data collection. We are indebted and thankful to the students for their participation and to their parents who gave their consent to allow their children to participate in the study.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. World Health Organisation. Coming of age – Adolescence health, 2019. Available at: <https://www.who.int/health-topics/adolescents/coming-of-age-adolescent-health>. Accessed 25 October 2019.
2. World Health Organisation. Maternal, new born and adolescent health, 2019. Available at https://www.who.int/maternal_child_adolescent/adolescence/universal-health-coverage/en/. Accessed on 25 October 2019.
3. Maliye C, Garg BS. Adolescent health and adolescent health programs in India. *J Mahatma Gandhi Inst Med Sci*. 2017;22:78-82.

4. Kotecha PV, Patel S, Mazumdar VS, Baxi RK, Misra S, Mehta KG et al. Identification and ranking of problems perceived among urban school going adolescents in Vadodara in India. *Indian J Clin Pract*. 2011;21:555-65.
5. Akinbami FO, Okereke JO, Orimadegun AE. The bowel habits of adolescents in Nigeria. *Trop gastroenterol*. 2010;31(4):295-302. Available at <http://www.tropicalgastro.com/printerfriendly.aspx?id=366>. Accessed on 20 May 2020.
6. Ray G. Evaluation of the symptom of constipation in Indian patients. *Journal of clinical and diagnostic research*. 2016;10(4):1-3.
7. Lee BR, Ko YM, Mi Hee Cho MH, Yoon YR, Kye SH, et al. Effects of 12-week Vegetarian Diet on the Nutritional Status, Stress Status and Bowel Habits in Middle School Students and Teachers. *Clin Nutr Res*. 2016;5:102-11.
8. Staudacher HM, Whelan K, Irving PM, Lomer MC. Comparison of symptom response following advice for a diet low in fermentable carbohydrates (fodmaps) versus standard dietary advice in patients with irritable bowel syndrome. *J Hum Nutr Diet*. 2011;24:487-95.
9. Miwa H. Life style in persons with functional gastrointestinal disorders: large-scale internet survey of lifestyle in Japan. *Neurogastroenterol motil*. 2012;24:464-71.
10. Sajitha N, Praseeda S, Beena Kumari R. Role of Diet and Body Mass Index on the pattern of bowel habits among students. *J Med Sci Clin Res*. 2020;8(5):652-9.
11. Lee DW, Koo JS, Kang S, Kim SY, Hyun JJ, Jung SW, et al. Association between bowel habits and quality of bowel preparation for colonoscopy. *Medic*. 2017;96(29).
12. Panirgrahi MS, Kar SK, Singh SP, Ghoshal UC. Defecation Frequency and Stool Form in the Coastal Eastern Indian Population. *J Neurogastroenterol Motil*. 2013;19(3):374-80.
13. Sujatha B, Velayutham DR, Deivamani N, Bavanandam S. Normal Bowel Pattern in Children and Dietary and Other Precipitating Factors in Functional Constipation. *J Clinic Diagnost Research*. 2015;9(6):SC12-5.
14. Kondapalli CS, Gullaapalli S. Constipation in children: incidence, causes in relation to diet pattern and psychosocial aspects. *Int J Contemp Pediatr*. 2018;5(1):6-13.

Cite this article as: Shiyam V, Nishanthini N, Niranjjan R, Lokeshmaran A. A comparative study on bowel habits among the rural and urban school going adolescents of Puducherry. *Int J Community Med Public Health* 2020;7:4597-603.