

# To study clinical spectrum and etiology of recurrent abdominal pain in children 5-15 yrs of age.

Varsha Mane\*, Anjali Otiv, Minakshi Bhat, Chandrashekhar Koli

Department of Paediatrics, Terna Medical College, Maneesha Society, Gavanpada, Maharashtra, India

Received: 23 October, 2023, Manuscript No. AAJCP-23-119822; Editor assigned: 25 October, 2023, Pre QC No. AAJCP-23-119822 (PQ); Reviewed: 10 November, 2023, QC No. AAJCP-23-119822; Revised: 17 November, 2023, Manuscript No. AAJCP-23-119822 (R); Published: 24 November, 2023, DOI:10.35841/0971-9032.27.11.2086-2091.

## Abstract

**Objective:** To evaluate the spectrum of causes of recurrent abdominal pain in children in tertiary institute and need of change in management.

**Study design:** Hospital based prospective study was done on 85 children (5 to 15 years) attending tertiary centre, fulfilling Apley's criteria of RAP. Detailed history and clinical presentation was recorded from each subject and underwent routine investigations (urine, stool analysis, complete blood picture, USG abdomen). Treatment was given according to hospital protocols and 79 were followed up for period of 3 months to evaluate the cause and response of RAP. Chi-square ( $\chi^2$ ) (categorical data) and student's t test (quantitative data) were used.

**Results:** Out of total 79 patients of RAP, 44 (55.7%) were males and 35 (44.3%) were females of all, majority 58 (73.41%) were falling into age group of 5 to 10 yrs, with male predominance. Amongst various causes, 18 (22.78%) were attributed to organic cause and (77.21%) to nonorganic cause. Periumbilical type of pain, nausea, and headache affected scholastic performance 20 of 61, school absenteeism 35 of 61, poor socioeconomic status 17 of 61. Poor eating habits (15) and stressor of adjustment problem, sibling rivalry (16) were significantly associated with nonorganic RAP.

**Conclusion:** We found statistically significant number of children presenting with RAP were nonorganic type. Lifestyle changes, food habits, adjustment disorder, parental anxiety and sibling-rivalry were their significant associations. More studies are needed to emphasize the inclusion of psychiatric evaluation and behavioral therapy in every case of RAP for a timely and appropriate management.

**Keywords:** Gastrointestinal disorders, Motility disturbance, Visceral hypersensitivity, Altered mucosal and immune function, Altered gut micro biota.

Accepted on 19<sup>th</sup> October, 2023

## Introduction

Recurrent Abdominal Pain (RAP) is a common problem in paediatric practice, with prevalence estimates ranging from 2%-41% [1]. Between 4% and 25% of school-aged children intermittently experience RAP, sufficient to interfere with their activities of daily living [2,3]. An organic cause is found in 5%-10% of children with RAP [4], if RAP is not associated with an anatomic, metabolic, infectious, inflammatory, or neoplastic disorder, it is considered functional (nonorganic) abdominal pain [5]. The worldwide pooled prevalence of functional abdominal pain in children is 13.5% (95% confidence interval, 11.8% to 15.3%). The pathogenesis underlying abdominal pain related-functional gastrointestinal disorders remains unclear [6]. Functional abdominal pain is a clinical diagnosis and does not require a diagnostic workup. Rome IV criteria are a standardized system to assist with diagnosis and management of childhood functional gastrointestinal disorders.

RAP in children represents a group of functional gastrointestinal disorders that have an unclear aetiology. The latest consensus from the Rome foundation suggest these

disorders are related to motility disturbance, visceral hypersensitivity, altered mucosal and immune function, altered gut micro biota and altered central nervous system processing. They suggest RAP is "the product of interactions of psychosocial factors and altered gut physiology via the brain-gut axis" [7]. There is no consensus or guidelines on which treatments to offer patients, hence treatment of RAP remains inconsistent. RAP is associated with school absences, hospital admissions and on occasions, unnecessary surgical intervention [8-10].

The data from trials to date provide some evidence for beneficial effects of CBT and hypnotherapy in reducing pain in the short term in children and adolescents presenting with RAP [7]. We intend to evaluate the spectrum of causes of recurrent abdominal pain in children in our tertiary institute and need of change in management.

## Materials and Methods

It was a prospective observational study designed to assess all children aged 5-12 years, attending Terna medical college OPD. All the children suffering from RAP were investigated.

**Inclusion criteria:**

All children aged 5-12 years, attending OPD, for recurrent abdominal pain.

**Exclusion criteria:**

Children having kochs, pancreatitis, and hepatitis 85 children with recurrent abdominal.

Pain was evaluated by a standardized history, physical examination and laboratory tests. There was attrition of 6; a written informed consent was taken from parents of all children who fulfilled the inclusion criteria. Proper ethical clearance was taken from the ethical committee of the institution before starting the study. Detailed history and physical examination was noted in a structured proforma. All the alarm symptoms were recorded. It was applied individually on each child (or his/her caregiver). Data was collected from each subject as regard: His/her detail history, alarm symptoms, socio-demographic characteristics, characters of RAP (its type, severity, onset, duration, frequency, site and its relation to other symptoms), some organic and psychological symptoms and history of family troubles and school related problems and

clinical examination. In pubertal adolescents, pelvic and scrotal examination was a part of the initial evaluation

The presence of specific findings on physical examination directed a prompt further workup they were subjected to routine investigations (urine and stool analysis, complete blood picture, USG abdomen) to exclude the possible organic cause for their RAP. CT abdomen or other investigations was done as needed. Treatment of each case was done according to hospital protocols and were followed up for a period of at least three months.

**Results**

There were total of 79 patients fulfilling criteria of recurrent abdominal pain out of which 44 (55.7%) were male children and 35 (44.3%) were female children.

**Age and gender wise distribution**

Amongst all children with recurrent abdominal pain, 58 (73.41%) were falling into age group of 5 to 10 yrs whereas 21 (26.6%) were in the age group of 10-15 yrs. Male predominance was seen in both the age groups (Table 1).

Age (years)	Males in number	Percentage (%)	Female	Percentage	Total
5-10	30	51.70%	28	48.27%	58 (73.41%)
11-15	14	66.60%	7	33.30%	21 (26.6%)

**Table 1.** Age and gender wise distribution.

**Causes of RAP**

Amongst the various causes of recurrent abdominal pain, 18 (22.78%) were attributed to organic cause and (77.21%) were attributed to nonorganic cause.

There were 3 cases each of mesenteric lymphadenitis and worm infestations, 2 cases of abdominal tuberculosis,

constipation and cystitis each. One child underwent upper gastro intestinal endoscopy and was diagnosed as a case of gastritis. The remaining causes included ovarian cyst, renal calculus, giardiasis, liver hemangioma, ovarian cyst and lobar pneumonia with hepatopathy one each.

- Correlation of type and location of pain with cause of RAP.
- Periumbilical pain was significantly associated with functional RAP (Table 2).

Causes	No. of males	Females
Mesenteric lymphadenitis	2	1
Abdominal tb	2	0
Renal calculus	1	0
Giardiasis	1	0
Gastritis	0	1
Worm infestation	2	1
Liver haemangioma	1	0
Constipation	2	0
Cystitis	0	2
Lobar pneumonia with hepatopathy	1	0
Ovarian cyst	0	1

**Table 2.** Organic causes of pain abdomen found in children.

### Symptoms other than abdominal pain

There were number of symptoms noted amongst the cases of recurrent abdominal pain like nausea, headache, vomiting, constipation, increased stool frequency, bloating, urinary.

symptoms and irregular bowel movements.

Amongst these symptoms, nausea and headache were seen more in cases of non-organic RAP and this association was statistically significant (Table 3).

Symptoms	Organic Out of 18 n=no (%)	Non organic Out of 61 n=no (%)	P-value
Nausea	5 (27.77%)	20 (32.78%)	0.00000578
Vomiting	6 (33.33%)	1 (1.63%)	0.35591768
Constipation	2 (11.11%)	1 (1.63%)	0.42264973
Increased stool frequency	8 (44.44%)	2 (3.27%)	0.08051624
Bloating	1 (5.55%)	5 (8.19%)	0.12566592
Headache	2 (11.11%)	25 (40.98%)	0.00159617
Urinary symptoms	2 (11.11%)	0 (0%)	1
Irregular bowel movements	10 (55.55%)	2 (3.27%)	0.07338803

Table 3. Symptoms other than pain abdomen.

### Social impact of RAP

Majority of children with non-organic RAP had affected scholastic performance (20 of 61) and school absentees (35 of 61) and it was statistically significant.

17 children of total of 61 with nonorganic RAP belonged to poor socioeconomic status which was statistically significant.

15 children with nonorganic RAP had lifestyle of poor eating habits-junk food and irregular meals whereas 16 had a stressor in form of adjustment problem or sibling rivalry. It was statistically significant. All these social impacts were observed in organic RAP too but it was not statistically significant (Table 4).

Parameters	Organic RAP out of 18 n=no (%)	Functional RAP out of 61 n=no (%)	P-value
Scholastic performance affected	3 (16.66%)	20 (32.78%)	0.0002732
School absentism	5 (27.77%)	35 (57.37%)	0.00000036
Family and parental disputes	1 (5.55%)	20 (32.78%)	0.0318045
Poor socioeconomic status	7 (38.88%)	17 (19.67%)	0.0000006
Lifestyle changes	5	15	0.00002384
Sibling rivalry	1	10	0.04237861
Parental anxiety	5	15	0.00000036
Poor food habits	7	17	0.0000006

Table 4. Social impact of RAP.

Data was entered in MS excel format of computer software and analyzed using SPSS (version 20). Descriptive data were arranged in tabular form and expressed in frequency and percentages. To elucidate the associations and comparisons between different parameters, chi square ( $\chi^2$ ) was used for categorical data and student's t test was used for quantitative data. P-value of less than 0.05 was considered statistically significant.

### Discussion

Recurrent Abdominal Pain (RAP), as described in Apley's seminal work, refers to a constellation of symptoms

characterized by at least three episodes of abdominal pain, severe enough to interfere with psychosocial functioning, over a period of at least 3 months [11]. Von Baeyer defined chronic abdominal pain by adding criteria of impact on daily functioning, whereas "Pediatric Rome Criteria III" (PRC-III) classified abdominal pain-related Functional Gastrointestinal Disorders (FGIDs) using a symptom based approach [12,13]. The worldwide pooled prevalence of functional abdominal pain in children is 13.5% (95% Confidence Interval (CI), 11.8%-15.3%).

We have studied all these factors in a cohort of 79 children who fully satisfied the criteria of RAP. Our study is observational one

in which 1 lakh of OPD patients in the age group 5-15 yrs were screened in OPD over one year. 85 children were found to have abdominal pain satisfying the criteria of RAP according to definition by Apley. There was attrition of 6.

Of total 79 patients, 44 (55.7%) were males and 35 (44.3%) were females. Similar male predominance was seen in a study conducted by Bharat et al., and Lokesh et al., study which was 62.8% and 56.10% respectively but the difference in both the studies was not statistically significant [14,15]. In our study, 5-10 yrs age group was significantly associated with RAP affecting 58 (73.41%). The mean age was 8 yrs. In the study done by Stordal et al., [16] on 44 children aged 2-15 years, the mean age was 8.3 years whereas in another study done by Menon et al., [17] in 152 children, age range was 2-15 yrs and mean age was 8.9 years. Findings of both the studies are similar to our study.

However, different pattern was noted by Madani et al., showing clustering of cases between 8-10 and 15-17 years of age [18]. A systematic review in 2005 found evidence for a bimodal peak in the symptoms of recurrent abdominal pain being more prevalent between 4 and 6 years and preadolescence [19], compared to a 2015 study reporting a bimodal early peak at 5-7 years and a late peak at 11-14 years [20]. The significance of this secular trend in age at presentation is not well understood.

The various symptoms observed in our study were nausea, headache, vomiting, constipation, increased stool frequency, bloating, urinary symptoms and irregular bowel movements. Amongst these nausea and headache were statistically significant for non-organic cause. In the study of childhood functional abdominal pain by Leo et al., headaches and bloating were associated with GPFAP [21]. Somatization and a family history of GI complaints have been found by others to be associated with FAP. Although somatization showed a tendency toward a statistically significant association with GPFAP ( $p=0.08$ ) they could not fully confirm these findings periumbilical and daytime pain was significantly associated with functional RAP whereas characteristic of pain could not be correlated.

Similarly periumbilical pain was shown in significant number of patients by other studies by Devanarayana et al., [22] and Liebman et al., [23] in 1978 on clinical pattern of 119 children with RAP. Most common timing of pain abdomen (72.84%) was morning hours/before going to school (8.64%) patients reported pain during school time, 7 (8.64%) in the evening, 5 (6.18%) after coming from school and 3 (3.70%) at meal time. Similar finding was seen in Lokesh et al., study.

In our study, pallor was most common findings followed by constipation and mesenteric lymphadenopathy. This was consistent with study by Lokesh et al., and Liebman [23]. However, Devanarayana et al., [22] reported associated symptoms in more number of patients which included headache (41.81%), anorexia (30.9%), lethargy (23.6%), weight loss (27.27%), constipation (12.73%), dysuria (18.18%),

and joint pain (18.18%). Amongst the various causes of recurrent abdominal pain, 18 (22.78%) were attributed to organic cause and (77.21%) were attributed to nonorganic cause in our study.

As studied by Apley et al., approximately 10% to 15% of children and adolescents had RAP, less than 10% were found to have an organic illness. In a large study of school aged children, an organic cause was found in less than 10% of children with recurrent abdominal pain [23-25]. In some of the subsequent studies, the percentage of children with organic RAP was found to be higher than initially reported by Apley [14,26,27].

In the study of childhood functional abdominal pain by Leo et al., in 90% of children the GP suspected FAP. Of 265 children with GPFAP, 130 (50.6%) fulfilled FGID criteria [21]. This was similar to our study. All these various studies showed different results. Recent studies found organic abnormalities in 45%-88% [16,28]; however, these studies were performed in specialist care settings and selection of patients and excessive testing may have yielded higher proportions of organic abnormalities.

In our study, amongst the organic causes, there were 3 cases each of mesenteric lymphadenitis and worm infestations and 2 cases each of abdominal tb, constipation and cystitis.

The remaining causes included ovarian cyst, renal calculus, giardiasis, gastritis, liver hemangioma, ovarian cyst and lobar pneumonia with hepatopathy. In study of Lokesh et al., spectrum was constipation (13.4%). Abnormal USG findings (19.5%), the most common finding mesenteric lymphadenopathy (>8 mm short diameter) in 14/82 (17.07%) cases followed by ovarian hemorrhagic cyst and enlarged solitary kidney in one, urinary tract infection in 9 (10.98%) and protozoal (entamoeba histolytica) infection in one patient only [15].

In a similar prospective study conducted by Van der et al., [29] on 93 children aged between 5.5-12 years with recurrent abdominal pain, organic abnormalities were found in 3 cases (3.2%) only duplex kidney, unilateral kidney agenesis, enlarged spleen (9 cm) one case each. In a study by Wewer et al., eight children (7%) revealed causes like gallbladder stone, splenomegaly, and urogenital abnormalities on USG [30].

### ***This is consistent with our results of predominant functional causes***

On the contrary in a study conducted by Balani et al., on 35 children aged 5-12 years with recurrent abdominal pain, organic abnormalities were found in more percentage of patients 14 (UTI in 15.4%, giardiasis in 38.4%, giardiasis and worm infestation in 7.7%, chronic gastritis in 26.9%, esophagitis in 26.9%, amoebiasis in 7.7% and worm infestation in 7.7%).

17 children of total of 61 with nonorganic RAP belonged to poor socioeconomic status which was statistically significant. This can be correlated with poor nutrition. We found maximum

parental educational level and income was lower class. In Lakshman et al., study on clinico-etiological profile of recurrent abdominal pain in children aged 5-15 Years; almost 80% of fathers and 70.6% mothers of study children had education level up to schooling [15]. Patients belonging to lower socio economic status were more (70.73%) as compared to middle socio economic family (28.05%). Similar results were found in study, conducted by Boey et al., [14], who determined the prevalence of Recurrent Abdominal Pain (RAP) among Malaysian school children aged 11 to 16 years to be higher in children whose fathers had a lower educational attainment ( $P=0.002$ ) and in those with lower family income [31].

A systematic review found moderate evidence for parental GI problems to be a risk factor for persistence of chronic abdominal pain in children [32]. A family history of GI disorders was reported in 15.4% cases in at least one parent in a recent study [33], whereas Madani et al., had such a history among parents and siblings in 10.5% cases [18]. Even though a correlation was not found in our study, this historical information is important to keep in mind in the evaluation of these patients. Cross sectional and longitudinal studies have suggested that childhood RAP may be associated with parental anxiety and depression, most often assessed in mothers 8, 124-127. This was consistent with our finding however our study showed a statistically significant correlation of lifestyle changes, adjustment disorders, eating habits and junk food. Majority of children with non-organic RAP had affected scholastic performance (20 of 61) and school absentees' (35 of 61) and it was statistically significant [34].

15 children with nonorganic RAP had lifestyle of poor eating habits-junk food and irregular meals. It was statistically significant. Similar significance of emotional components like adjustment problems, stressful life events, sibling rivalry and psychology issues like school phobia, family psychopathology was noted in our study. This was consistent with other studies emphasizing importance of the EQ background children with RAP [11,14,26].

## Conclusion

We found statistically significant number of children presenting with recurrent abdominal pain were nonorganic type. There were number of symptoms noted amongst the cases of recurrent abdominal pain like nausea, headache, vomiting, constipation, increased stool frequency, bloating, urinary symptoms and irregular bowel movements but nausea and headache was significantly associated with non-organic RAP. Periumbilical and daytime pain was significantly associated with functional RAP. Pallor was most common findings followed by constipation and mesenteric lymphadenopathy amongst the organic abdominal pain we noted mesenteric lymphadenitis, worm infestations, abdominal tuberculosis, cystitis, constipation whereas lifestyle changes, poor food habits, adjustment disorder, parental lower income, education and anxiety were the significant associations with non-organic RAP. Thus psychiatric evaluation and behavioral therapy holds role in management and needs to be studied further. More

studies are needed to emphasize the inclusion of psychiatric evaluation and behavioral therapy in every case of RAP for a timely and appropriate management.

## References

1. Korterink JJ, Diederer K, Benninga MA, et al. Epidemiology of pediatric functional abdominal pain disorders: A meta-analysis. *PLoS One* 2015; 10: e0126982.
2. Konijnenberg AY, Uiterwaal CS, Kimpfen JL, et al. Children with unexplained chronic pain: substantial impairment in everyday life. *Arch Dis Child* 2005; 90: 680-6.
3. Youssef NN, Murphy TG, Langseder AL, et al. Quality of life for children with functional abdominal pain: A comparison study of patients' and parents' perceptions. *Pediatrics* 2006; 117: 54-9.
4. Romano C, Porcaro F. Current issues in the management of pediatric functional abdominal pain. *Rev Recent Clin Trials* 2014; 9(1): 13-20.
5. American academy of pediatrics subcommittee on chronic abdominal pain. Chronic abdominal pain in children. *Pediatrics* 2005; 115(3): 812-815.
6. Di Lorenzo C, Colletti RB, Lehmann HP, et al. Chronic abdominal pain in children: A technical report of the American academy of pediatrics and the North American society for pediatric gastroenterology, hepatology and nutrition. *J Pediatr Gastroenterol Nutr* 2005; 40(3): 249-61.
7. Abbott RA, Martin AE, Newlove-Delgado TV, et al. Psychosocial interventions for recurrent abdominal pain in childhood. *Cochrane Database Syst Rev* 2017; 10; 1(1): CD010971.
8. Scharff L. Recurrent abdominal pain in children: A review of psychological factors and treatment. *Clin Psychol Rev* 1997; 17: 145-66.
9. Stordal K, Nygaard EA, Bentsen BS. Recurrent abdominal pain: A five year follow-up study. *Acta Paediatr* 2005; 94: 234-6.
10. Walker LS, Guite JW, Duke M, et al. Recurrent abdominal pain: A potential precursor of irritable bowel syndrome in adolescents and young adults. *J Pediatr* 1998; 132: 1010-5.
11. Apley J, Naish N. Recurrent abdominal pains: A field survey of 1,000 school children. *Arch Dis Child* 1958; 33: 165-70.
12. Von Baeyer CL, Walker LS. Children with recurrent abdominal pain: Issues in the selection and description of research participants. *J Dev Behav Pediatr* 1999; 20: 307-312.
13. Rasquin A, Di Lorenzo C, Forbes D, et al. Childhood functional gastrointestinal disorders: Child/adolescent. *Gastroenterology* 2006; 130: 1527-37.
14. Balani B, Patwari AK, Bajaj P, et al. Recurrent abdominal pain-A reappraisal. *Indian Pediatr* 2000; 37: 876-81.
15. Lakhani P, Saransh S, Sandip G, et al. Clinico-etiological profile of recurrent abdominal pain in children aged 5-15 years. *JMSCR* 2017; 8(4): 678.

16. Stordal K, Nygaard EA, Bentsen B. Organic abnormalities in recurrent abdominal pain in children. *Acta Paediatr* 2001; 90: 638-42.
17. Iqbal AM, Lal MN, Murtaza G, et al. Recurrent abdominal pain in children. *Pak J Med Sci* 2009; 25(1): 26-30.
18. Madani S, Cortes O, Thomas R. Cyproheptadine use in children with functional gastrointestinal disorders. *J Pediatr Gastroenterol Nutr* 2016; 62(3): 409-413.
19. Chitkara DK, Rawat DJ, Talley NJ. The epidemiology of childhood recurrent abdominal pain in Western countries: A systematic review. *Am J Gastroenterol* 2005; 100(8): 1868-1875.
20. Talachian E, Bidari A, Zahmatkesh H. Abdominal pain-related functional gastrointestinal disorders based on Rome III criteria in a pediatric gastroenterology clinic. *Med J Islam Repub Iran* 2015; 29: 247.
21. Spee LA, Lisman-Van Leeuwen Y, Benninga MA, et al. Prevalence, characteristics, and management of childhood functional abdominal pain in general practice. *Scand J Prim Health Care* 2013; 31(4): 197-202.
22. Devanarayana NM, de Silva DG, de Silva HJ. Aetiology of recurrent abdominal pain in a cohort of Sri Lankan children. *J Paediatr Child Health* 2008; 44: 195-200.
23. Liebman W. Recurrent abdominal pain in children. *Clin Pediatr Phila* 1978; 17: 149-53.
24. Carlo Di L, Richard B C, Harold P L, et al. Chronic abdominal pain in children: A clinical report of the American academy of pediatrics and the North American society for pediatric gastroenterology, hepatology and nutrition. *J Pediatr Gastroenterol Nutr* 2005; 40: 245-48.
25. Shanon A, Martin DJ, Feldman W. Ultrasonographic studies in the management of recurrent abdominal pain. *Pediatrics* 1990; 86: 35-38.
26. Dutta S, Mehta M, Verma IC. Recurrent abdominal pain in Indian children and its relation with school and family environment. *Indian Pediatr* 1999; 36: 917-20.
27. Buch NA, Ahmad SM, Ahmad SZ, et al. Recurrent abdominal pain in children. *Indian Pediatr* 2002; 39: 830-34.
28. Gijsbers CF, Benninga M, Büller H. Clinical and laboratory findings in 220 children with recurrent abdominal pain. *Acta Paediatr* 2011; 100: 1028-32.
29. Van der Meer SB, Forget PP, Arends JW, et al. Diagnostic value of ultrasound in children with recurrent abdominal pain. *Pediatr Radiol* 1990; 20: 501-503.
30. Wewer V, Strandberg C, Paerregaard A, et al. Abdominal ultrasonography in the diagnostic work-up in children with recurrent abdominal pain. *Eur J Pediatr* 1997; 156: 787-788.
31. Boey CC, Yap SB, Goh KL. The prevalence of recurrent abdominal pain in 11 to 16 years old Malaysian school children. *J Pediatr Child Health* 2000; 36: 114-16.
32. Gieteling MJ, Bierma-Zeinstra SM, Passchier J, et al. Prognosis of chronic or recurrent abdominal pain in children. *J Pediatr Gastroenterol Nutr* 2008; 47(3): 316-326.
33. Talachian E, Bidari A, Zahmatkesh H. Abdominal pain-related functional gastrointestinal disorders based on Rome III criteria in a pediatric gastroenterology clinic. *Med J Islam Repub Iran* 2015; 29: 247.
34. Michael Steven S, Nicholas H, Steven James K, et al. An international survey of pain in adolescents. *BMC Public Health* 2014; 14: 447.

**\*Correspondence to:**

Varsha Mane

Department of Paediatrics,  
Terna Medical College

Maneesha society, Mulund East, India

E-mail Id: drvarshacardio@gmail.com