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Clinico-Etiological Profile and Ultra sonographic Evaluation of Recurrent Abdominal Pain in Children Aged 5 Years to 18 Years in Tertiary Care Centre

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A B S T R A C T

Introduction*: Recurrent Abdominal Pain (RAP) is frequent in youngsters and affects 10% to 20% of students. Even though RAP is referred to as chronic, each pain episode is unique and spaced out by intervals of well-being. Younger children have poor pain localization, and physical evaluation of a hurting youngster is frequently limited.*

Objective: *To evaluate clinico-etiological profile & ultrasonographic evaluation of recurrent abdominal pain in children aged 5 to 18 years in a tertiary care center at Jaipur, Rajasthan, India.*

Methods: *Hospital based observational study with duration from August 2022 to December 2023. It was conducted in the Department of Paediatrics, Mahatma Gandhi Medical College & Hospital, Jaipur, Rajasthan.*

Results: *Study included 72 children aged 5 to 18 who met Apley's criteria for recurrent stomach discomfort. Results are based on ultrasonographic findings and clinico-etiological characteristics of children experiencing recurring stomach pain, which has been discussed in study.*

KEYWORDS: *Recurrent abdominal pain, Irregular bowl movements, functional pain abdomen*

INTRODUCTION

Recurrent Abdominal Pain (RAP) is frequent in youngsters and affects 10% to 20% of students.(1) Recurrent abdominal pain syndrome (RAP syndrome) is the term given to cluster of symptoms when

abdominal pain becomes severe enough to interfere with daily activities. RAP syndrome is defined as "at least three episodes of period longer than three months.(2)
In order to determine the cause of the discomfort and rule out other acute abdominal surgical disorders, a sonographic evaluation of the abdomen is therefore routinely carried out on children.(3)
The term "RAP" primarily refers to the length and frequency of painful episodes. It is generally defined as lasting at least three months, during which there are at least three instances of pain severe enough to interfere with daily activities.
Chronic abdominal pain is quite common among children and carries significant personal and social costs.(4)
It can lead to a diminished quality of life that is similar to that seen in organic gastrointestinal conditions.(5) The global prevalence is estimated at 13.5%, with similar rates across different regions.(6) It is more frequent in females, peaking during early adolescence.
The prevalence of RAP in children varies between 10 to 20%, with organic lesions identified in 5 to 10% of cases.(7)

Aims and Objectives
This study was planned with objective to evaluate clinico-etiological profile & ultrasonographic evaluation of recurrent abdominal pain in children aged 5 to 18 years in a tertiary care center at Jaipur, Rajasthan, India.

METHODS

It was a hospital based observational study with duration from August 2022 to December 2023. It was conducted in the Department of Paediatrics, Mahatma Gandhi Medical College & Hospital, Jaipur, Rajasthan. Ethical clearance was taken by the Institutional Review Board for Ethical Clearance of Mahatma Gandhi Medical College & Hospital, Jaipur, Rajasthan. All subjects /attendants were explained about the procedure involved and purpose of the study. All consenting patients /attendants were asked to sign a written informed consent form (in the language best understood by them). Complete confidentiality regarding patient's information was maintained at all stages of study and was not revealed at any point of time. No changes in standard treatment plan were made for the purpose of this study. There was no additional financial burden on the patient due to the study.

Inclusion & Exclusion Criteria:
Cases of recurrent abdominal pain of either gender who visited Paediatrics department were included, of the age group between 5 years to 18 years, who fulfilled Apley's criteria: i. e a child having recurrent abdominal pain, with at least three episodes which affect the daily activities of the child over a period of at least three months or more. (8)
Exclusion criteria applied was-age less than 5 years, having pre-menstrual pain, Known case of any surgical illness & children whose guardians did not give consent

Sample Size:
All patients who attended OPD, Emergency or admitted to Paediatric ward from August 2022 – December 2023. During the study period we were able to recruit 72 subjects.

Sampling Technique:
Simple Random Sampling was done.

Study Procedure:
After enrolment in the study, subject's detailed history was recorded on pre-structured Proforma and physical examination was done including detailed abdominal examination and findings were recorded. All patient underwent routine investigations which consisted of complete blood count, liver function test, renal function test, Urine routine and microscopy, Ultra Sonography of abdomen and pelvis & Xray abdomen (on basis of history/ examination.), Serum tissue transglutaminase (s.TTG IgA) (on basis of history/examination.), thyroid profile(T3, T4, TSH (on basis of history/examination.).

Statistical Analysis:
Data so collected was tabulated in an excel sheet, under the guidance of statistician. The means and standard deviations of the measurements per group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA). Difference between two groups was determined using t chi square test and the level of significance was set at $p < 0.05$.

RESULTS

Gender Distribution: The study population was made up of 40.28% female and 59.72% male participants. As a result, men dominated the current study.
Age Group (in years): 44.44%, 41.67% and 13.89% of the subjects were having age between 5-9, 10-13 and 14-18 years respectively.
Residence Distribution: 62.50% of the subjects live in urban area while 37.50% in rural area.
Organic Vs Inorganic Cause: Recurrent abdominal pain (RAP) occurred in 29.17% and 70.93% due to organic and inorganic cause respectively.
Organic Factors:
Urinary tract infection was found in 28.57% of the subjects while E. coli and Celiac disease in 14.29% each. Parasitic infection, Klebsiella, Abdominal tuberculosis and Helicobacter pylori Infection was reported in 9.52% of the subjects each. Enterobacter, Giardia lamblia and Entamoeba histolytica was revealed in 4.76% of the subjects each.

Organic	N= 21	%
Urinary Tract Infection	6	28.57
E. coli	3	14.29
Celiac disease	3	14.29
Parasitic infection	2	9.52
Klebsiella	2	9.52
Abdominal tuberculosis	2	9.52
Helicobacter pylori Infection	2	9.52
Enterobacter	1	4.76
Giardia lamblia	1	4.76
Entamoeba histolytica	1	4.76

Symptoms According to Etiology:

Nausea and headache was reported more in non-organic cause (35.29% and 47.06% respectively) as compared to organic cause (23.81% and 14.29% respectively). Symptoms like irregular bowel movements, increased stool frequency, vomiting and constipation was revealed more in organic cause as compared to nonorganic when compared using chi square test.

***statistically significant**

Pain Findings:

Table 6

Symptoms	Organic		Nonorganic		p value
	N=21	%	N=51	%	
Nausea	5	23.81	18	35.29	0.032*
Irregular bowel movements	13	61.90	2	3.92	<0.01*
Increased Stool Frequency	10	47.62	3	5.88	<0.01*
Vomiting	7	33.33	1	1.96	<0.01*
Constipation	3	14.29	1	1.96	0.006*
Bloating	2	9.52	3	5.88	0.13
Headache	3	14.29	24	47.06	<0.01*

Most of the subjects had suffered from pain since < 6MONTHS. Frequency of pain such as daily and once a week was reported more in non-organic. Commonly site effected in organic cases was umbilical while in nonorganic cause, it was away from umbilicus.

Table 7

Pain	Organic		Nonorganic		p value
	N=21	%	N=51	%	
Duration (months)					
<6	19	90.48	42	82.35	0.17
>6	2	9.52	9	17.65	
Frequency					
Once a month	2	9.52	11	21.57	0.041*
Once a week	13	61.90	16	31.37	
Daily	6	28.57	24	47.06	
Site					
Away from umbilicus	9	42.85	29	56.86	

Umbilical	12	57.14	22	43.14	0.08

*: statistically significant

Interference with sleep, school absence and stressor:
Interference with sleep, school absence and stressor was reported among 52.38%, 47.62%, 9.52% and 50.98%, 54.90%, 84.31% of the subjects in organic and nonorganic cases respectively.
USG Findings:
USG revealed no significant findings among 59.72% of the subjects. Most common USG finding was mesenteric lymphadenopathy (33.33%) followed by cystitis (4.17%) and Hydatid cyst (liver) respectively.

USG	N	%
Hydatid Cyst	2	2.78
Cystitis	3	4.17
Mesenteric Lymphadenopathy	24	33.33
No significant finding	43	59.72

DISCUSSION

If children have at least three episodes of abdominal pain that interfere with their everyday activities over the course of three months or longer, the child is considered to have RAP. Only 8% of individuals have organic pathology, which is one of the reasons of RAP, according to Apley's.
However, it could arise from either non-organic or organic sources. Organic RAP has been linked to cholelithiasis, constipation, peptic problems, dysmenorrhea, parasite infestations, and urinary tract infections. Non-organic RAP has been linked to psychological and emotional elements such as traumatic situations, sibling conflicts, school phobia, parental argument, etc.(9) Abdominal pain on a regular basis is linked to psychological suffering, particularly anxiety and depression. Abdominal pain that occurs frequently is also linked to more functional impairment in day-to-day living and absence from school. (10) Most children's pain has an organic origin, although ultrasonography is typically done to rule out any other underlying abnormalities. Sometimes, when graded compression ultrasonography is performed, larger mesenteric lymph nodes are found. (11) Different factors such as age, gender, genetic susceptibility, nutritional exposure, and environmental conditions influence the differential diagnosis of stomach discomfort in children. The study's objective was to evaluate the ultra sonographic findings and clinico-etiological characteristics of children experiencing recurring stomach pain.
The present observational study was conducted in the Department of Paediatrics, Mahatma Gandhi Medical College & Hospital, Jaipur, Rajasthan among 72 children of age group between 5 years to 18 years who fulfilled Apley’s criteria for recurrent abdominal pain.
Gender and Age The study population was made up of 40.28% female and 59.72% male participants. As a result, men dominated the current study. Of the subjects, 44.44%, 41.67%, and 13.89% were in the age range of 5–9, 10–13, and 14–18 years, respectively. The mean age of the 44 children with recurrent stomach discomfort, ages 2 to 15, in the study conducted by K Stordal et al. (12) was 8.3 years.

Aetiology of Organic Cause : Etiological factors for organic viz. urinary tract infection was found in 28.57% of the subjects, Klebsiella, Abdominal tuberculosis and Helicobacter pylori Infection was reported in 9.52% of the subjects each. Enterobacter, Giardia lamblia and Entamoeba histolytica was revealed in 4.76% of the subjects each. In their investigation, Saraswat et al. (13) they discovered that the most frequent organic cause—49.05%—was a urinary tract infection. While constipation is the most frequent organic aetiology in Sri Lanka, some etiological investigations conducted in India have identified intestinal parasite diseases, notably giardiasis, as the primary cause of RAP. Gastric reflux illness and persistent constipation are two frequent organic reasons in many affluent nations. (14)

Symptoms: Nausea and headache were reported more in non-organic cause (35.29% and 47.06% respectively) as compared to organic cause (23.81% and 14.29% respectively) with statistically significant difference as $p<0.05$ when compared using chi square test. The commonest presentation is periumbilical pain associated with autonomic and functional symptoms like nausea, vomiting, pallor and other painful conditions like headache and limb pains.Rasul CH et al(15), Devanarayana NM et al.(14)

Pain: Most of the subjects had suffered from pain since < 6 months. Frequency of pain such as daily and once a week was reported more in non-organic and organic cause respectively with statistically significant difference as $p <0.05$ when compared using chi square test. Commonly site affected in organic cases was umbilical while in nonorganic cause, it was away from umbilicus.

Stress: In this study; stress was reported among 9.52% and 84.31% of the subjects in organic and nonorganic cases respectively. Many previous researchers (Rasul CH et al15, Devanarayana NM et al14) have demonstrated a significant association between exposure to stressful life events and RAP.

USG Findings: USG revealed no significant findings among 59.72% of the subjects. Most common USG finding was mesenteric lymphadenopathy (33.33%) followed by cystitis (4.17%) and Hydatid cyst (liver) respectively. According to Vayner and Balakrishnan et al.(16), 61.4 and 72.1% of children, respectively, showed mesenteric lymphadenopathy. In contrast, our study's percentage of children with enlarged mesenteric lymph nodes is likely low because, unlike their study, ours used a short axis diameter of >8 mm to identify severe mesenteric lymphadenopathy, whereas theirs used a 4 mm or more threshold. In a similar study, Lakhan Poswal et al.(17) discovered that 16 cases (19.51%) showed aberrant USG findings, with mesenteric lymphadenopathy being the most common in 14 of the cases.

SUMMARY AND CONCLUSION

The current observational study included 72 children aged 5 to 18 who met Apley's criteria for recurrent stomach discomfort and was carried out in the Paediatrics department of the Mahatma Gandhi Medical College & Hospital in Jaipur, Rajasthan. The study's objective was to evaluate the ultra sonographic findings and clinico-etiological characteristics of children experiencing recurring abdominal pain.

The study's conclusions are summed up as follows:

1. There was male dominancy in the present study.
2. 44.44%, 41.67% and 13.89% of the subjects were having age between 5-9, 10-13 and 14-18 years respectively.
3. 62.50% of the subjects live in urban area while 37.50% in rural area.
4. Recurrent abdominal pain (RAP) occurred in 29.17% and 70.93% due to organic and nonorganic cause respectively.
5. Etiological factors for organic viz. urinary tract infection was found in 28.57% of the subjects while E.

Coli and Celiac disease in 14.29% each. Parasitic infection, Klebsiella, Abdominal tuberculosis and Helicobacter pylori Infection was reported in 9.52% of the subjects each. Enterobacter, Giardia lamblia

and Entamoeba histolytica was revealed in 4.76% of the subjects each.

6. Nausea and headache was reported more in non-organic cause (35.29% and 47.06% respectively) as compared to organic cause (23.81% and 14.29% respectively) with statistically significant difference as p value < 0.05.
7. Symptoms like irregular bowel movements, increased stool frequency, vomiting and constipation was revealed more in organic cause as compared to non-organic cause with statistically significant difference as p<0.05 when compared using chi square test.
8. Most of the subjects had suffered from pain since <6 months.
9. Frequency of pain such as daily and once a week was reported more in nonorganic and organic cause respectively with statistically significant difference as p<0.05 when compared using chi square test.
10. Commonly site effected in organic cases was umbilical while in nonorganic cause, it was away from umbilicus.
11. Interference with sleep, school absence and stressor was reported among 52.38%, 47.62%, 9.52% and 50.98%, 54.90%, 84.31% of the subjects in organic and nonorganic cases respectively.
12. Most common USG finding was mesenteric lymphadenopathy (33.33%) followed by cystitis (4.17%) and Hydatid cyst (liver) respectively.

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