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Original Research Article

Constipation in children: incidence, causes in relation to diet pattern and psychosocial aspects

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ABSTRACT

Background: The present study was conducted to study the incidence of constipation in children attending the paediatric Op and also to know the bowel pattern in constipated children and normal children with respect to food habits and regarding psychosocial aspect of toileting.
Methods: A study was done at Katuri Medical College and Hospital in 654 children with age group of 2-12yr of either sex. Children who fulfilled the ROME III criteria for constipation were analysed for demographic profile, socio-economic status, psychosocial aspects and dietary habits affecting bowel pattern. Data was collected and recorded from the parents in pre-fixed proforma. Stool frequency and type of stool passed was recorded for a week, with Bristol stool chart. Children in the study group without constipation were analyzed in similar pattern.
Results: A total of 654 children were analysed, out of which 202 children fulfilled the ROME III criteria for functional constipation. The prevalence of functional constipation was noted in 30.8% with female preponderance and incidence is more in the age group of2-4 years. In children without constipation, the average number of stools passed per day is 1.342 and the predominant type of stool is Type iv.
Conclusions: Constipation continues to be a problem, mostly under recognised in older population. Psychosocial factors had a significant effect on functional constipation. Skipping breakfast, early toilet practising, low intake of vegetables and fruits were other factors leading to constipation.

Keywords: Bowel pattern, Diet pattern, Habit constipation, Psychosocial factors

INTRODUCTION

Constipation is a symptom, not a disease. Different patients have different perceptions of symptoms. Some patients regard constipation as straining (52%), while for others, it means hard, pellet-like stools (44%) or an inability to defecate when desired (34%), or infrequent defecation (33%).

Symptoms must occur at least once per week for at least 2 months and include two or more of the following:

- Two or fewer defecations per week.
- At least one episode/week of incontinence after the acquisition of toileting skills.
- History of excessive stool retention.
- History of painful or hard bowel movements.
- Presence of a large fecal mass in the rectum.
- History of large diameter stools which may obstruct the toilet.

Accompanying symptoms may include irritability, decreased appetite, and/or early satiety. The

accompanying symptoms disappear immediately following passage of a large stool.

In day to day pediatric practice about 10% of children present with constipation; and 10% to 25% of referrals to pediatric gastroenterologists are for constipation.[1] Although often regarded as a less common and significant problem by many physicians, chronic constipation is of great importance to the child and his family. The early and accurate assessment and prompt treatment of constipation is vital to the child's wellbeing and life style. Delay in management will only exacerbate the problem and perpetuate the child's lack of self-esteem. As there are few published data on childhood constipation from Southern India, we conducted this study in and around villages of Katuri Medical College and Hospital, Chinakondrupadu.

Functional gastro-intestinal disorders especially constipation are common morbidity factors in otherwise healthy persons as well as in patients with various predisposing diseases. In the general population, constipation is frequently reported, resulting in 2.5 million of physician visits in the United States and a total health care cost of $2752 per patient treated.[2,3] The high prevalence rates, economic cost and adverse implications on the quality of life and health state, make constipation a major public health issue.[4,5]

Constipation is a common problem encountered in office practice. Although clinical profile of such children is well documented from the west, the same has not been described from the developing world. There is a scarcity of Indian literature on this topic. The normal bowel pattern in Indian children is virtually unknown. Only few studies are available from India. This study has been undertaken to analyze the normal bowel pattern in children in and around villages of Katuri Medical College and Hospital, to identify the predisposing factors in children with functional constipation, which is the most common cause of constipation. Objectives of present study were:

- To study the incidence of constipation in children.
- To evaluate the causes for constipation in relation to diet pattern and psychosocial aspect.
- To evaluate the clinical profile of children with habit constipation.
- To study the normal bowel pattern of children with respect to their food habits and collect data regarding psychosocial aspects of toileting issues.

METHODS

A descriptive study conducted at Department of Pediatrics Katuri Medical College and Hospital, Chinakondrupadu, Guntur, Andhra Pradesh, India. Study was conducted for the period from December 2013 to December 2014. Children in the age group of 2-12 years, of either sex who attended pediatric outpatient department of KMCH.

Inclusion criteria

- All the Children with age 2-12 years were included in the study.
- Children who fulfilled ROME III criteria for functional constipation were included in the study.

Exclusion criteria

- Children already on treatment for functional constipation and children with organic causes of constipation were excluded from the study.

After getting clearance from the Institutional Review Board and the Ethical Committee, the study was undertaken from December 2013. Out of 654 children attending pediatric OPD 202 children were identified to have constipation by applying Rome III criteria which constitute 30.88%. The demographic profile, socioeconomic status, presenting complaints, psychosocial aspects affecting normal bowel pattern, behavior, like temper tantrum, marital disharmony, sibling rivalry, school phobia, aversion to use school toilet were collected and recorded in a pre-structured proforma (Annexure I). The diet pattern of these children was also recorded in a diet chart (Annexure III), concentrating on the regularity of breakfast, vegetable and fruit intake, junk foods in the form of baked or fried items and regarding the consumption of milk. Stool frequency and type of stool passed was recorded for a period of one week, with Bristol stool chart being the reference for type of stool passed.

The proformas were filled by parents. Categorical data were expressed as absolute counts and percentages.

RESULTS

Out of 654 children, a total of 202 children satisfied ROME III criteria for functional constipation.

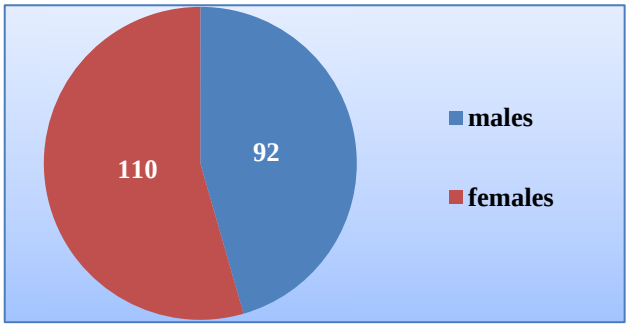

Figure 1: Sex distribution.

Out of 202 children with functional constipation, 110 were girls and boys were 92. There is an increased

incidence of constipation of female children comprising 54.4% against the incidence in males being 45.6% The female to male ratio was 1.1:1. The mean age in years of the study group was 5.5. The standard deviation was 3.085.

Table 1: Distribution of age and sex of functional constipation.

Age in Years	Boys (%)	Girls (%)	Total (%)
2-4	58 (28.7)	48 (23.7)	116 (57.42)
5-7	18 (8.9)	20 (9.9)	38 (18.81)
8-10	11 (5.44)	27 (13.36)	38 (18.81)
11-12	5 (2.4)	15 (7.4)	20 (9.90)
Total	92 (45.5)	110 (54.4)	202 (100)

The highest number of children presenting with constipation was in the age group of 2-4 years. The least number of children were from 10-12 years. In the initial 7 years, constipation was more common in boys. As age of presentation increases, the number of girls with constipation increase as compared to boys.

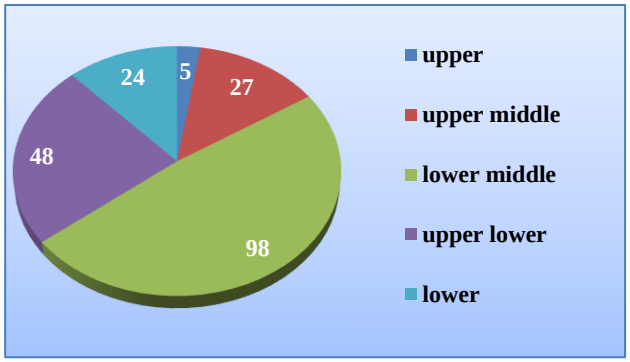

Figure 2: Socioeconomis status of functional constipation group.

Out of the 202 children with functional constipation, the highest number belonged to lower middle class, 98 (48.5%). The next group with highest number of children was upper lower, with 48 (23.7%). The rest of the children were distributed among upper middle class, 27 (13.3%), lower class, 24 (11.8%) and the least number of children were from upper class, 5 (2.4%).

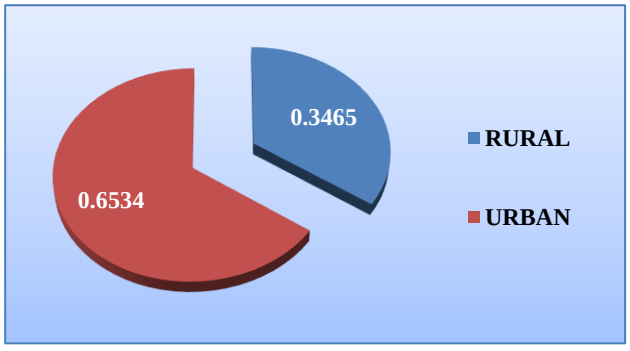

Figure 3: Distribution among different areas.

In children with functional constipation, the number of children from rural area were 70 (34.6%) and the rest of 132 (65.34%) belong to urban locality.

Table 2: Type of family in functional constipation group.

Type of Family	Total Number n = 202 (%)
Nuclear	152 (75.24)
Joint	41 (20.29)
Separated	9 (4.45)

In the functional constipation group, a large number of children 152 (75.24) out of 202 children lived in nuclear family, 41 (20.29) in joint family and 9 (4.45) of them were in separated families.

Table 3: Clinical profile of functional constipation.

Clinical profile	Number (%)
Abnormal posture	118 (58.4)
Fecal soiling	89 (44.5)
Recurrent abdominal pain	62 (30.6)
Blood streaked stools	22 (10.8)
Urinary symptoms	4 (1.9)
GERD	3 (1.5)

118 (58.4%) of functional constipation children had retentive behavior in the form of abnormal posturing. Abnormal posturing was more common in the age group of 2-4 (n=81) and the age it was most frequent was the second year n=33 (27.9%). Boys manifested this symptom more often than girls, n=62 (52.5%).

Fecal soiling was the present in 89 (44.05%) of children. lt was present in n=48 girls and n=41 in boys.

Recurrent abdominal pain as the presenting complaint was present in 62 (30.6%) of children. This symptom was present equally in both girls and boys n=31.

Urinary symptoms were present in 4 (1.9%) children with habit constipation and all of them were girls.

Blood streaked stools was present in 22 (10.8%) children. This was not the presenting symptom in most of them but was elicited during history taking.

Typical Gastro-esophageal reflux symptoms were present in 3 (1.5%) children with functional constipation.

Bowel habits

162 (80.1%) of children had stool frequency of <3 per week. Out of which 58 of them had stool frequency of one per week and 104 of them passed stools twice in a week.

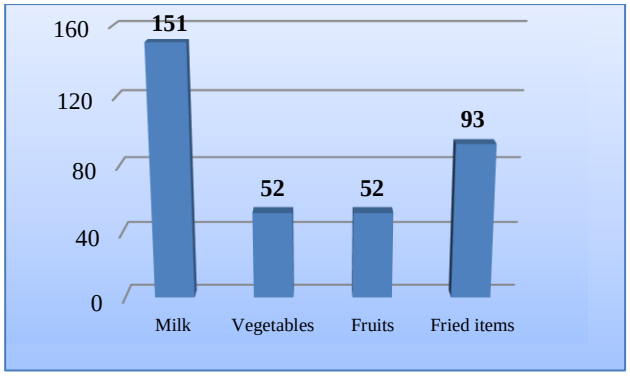

Figure 4: Intake of different foods.

The stool type in them was type I in 18 (8.9%) and type II in 75 (37.1%) and type III in 104 (51.4%), type IV in 5 (2.47%) according to the Bristol stool chart.

Children who passed stools greater than or equal to3 times per week n=40 (19.8%) had pellet like stool with incomplete bowel emptying. The average stools passed per week in this group is 2.044.

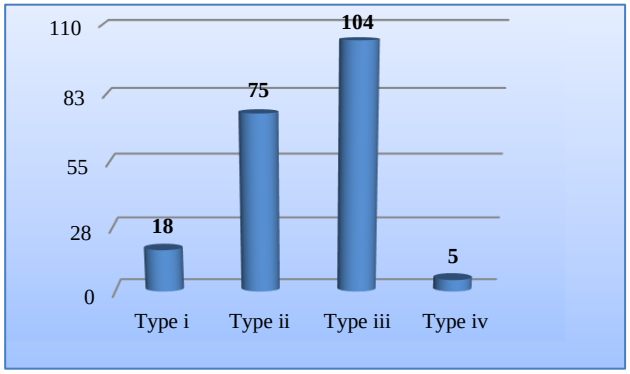

Figure 5: Types according to bristol stool chart.

Psychological precipitants

Toilet practicing in children was observed mostly between 12 to 36 months of age. In most of the children (n=141, 69.8%) toilet practices were observed between 12 to 18 months. The mean age at which toilet training was started was 16.19 months in the constipated group.

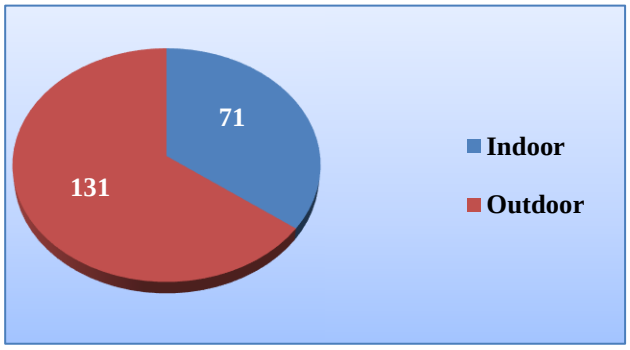

Figure 6: Location of toilet.

Table 4: Psychological precipitant factors in functional constipation group.

Precipitant	Percentage (%)
Marital dysharmony	23.2
Sibling rivalry	24.3
Temper tantrum	59.9
School phobia	10.8
Aversion to use school toilet	37.1

The location of the toilet was indoor in 71 (35.1%) and outdoor in 131 (64.8%).

Marital disharmony was present in 47 (23.2%) children, sibling rivalry in 49(24.2%), temper tantrum in 121 (59.9%) of children with constipation.

School phobia was present in 22 (10.8%) and unwillingness to use the school toilet was present in 74 (37.1%) children.

Diet

Milk was consumed by 151 (74.75%) constipated children. Vegetables and fruits intake were adequate in 52 (25.7%) and 52 (25.7%) of children respectively. Junk foods in the form of fried items and baked items formed 93 (46.03%) and 138 (68.3%) of children. Breakfast was skipped by 29 (14.5%) of children.

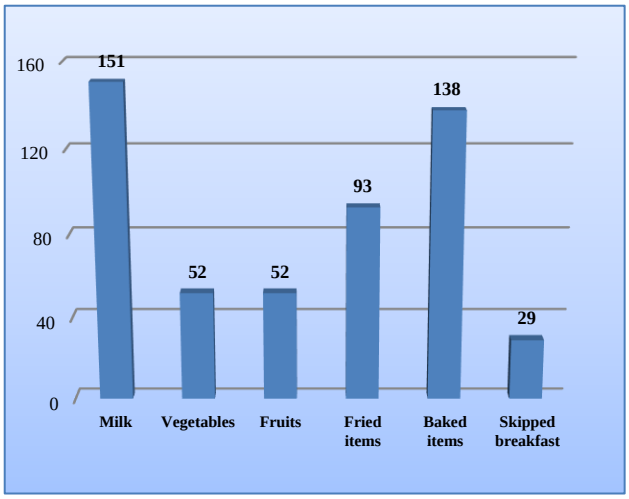

Figure 7: Consumption of different foods.

Normal bowel pattern results

Out of 654 children, 452 does not meet ROME III criteria for functional constipation. The mean age of these children was 6.7 years with a standard deviation of 2.5. Out of which the number of girls were 249 (55.08%) and their mean age was 6.9 years. The number of boys was 203 (44.91%) and the mean age for boys was 6.9 years. The female to male ratio was 1.2:1.

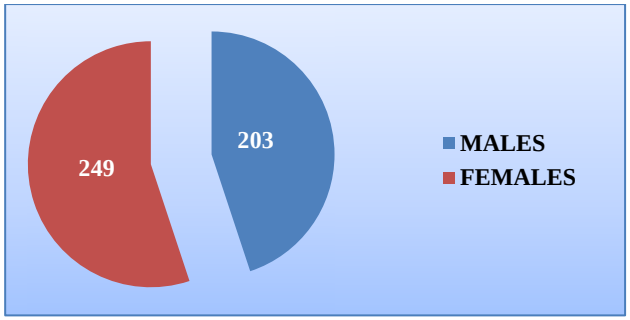

Figure 8: sex wise distribution among children who does not meet ROME-III criteria.

The distribution of girls and boys were almost equal in each age group. Out of the 452 children, 53.5% of them belonged to the age group of 2- 7 years.

Table 5: Distribution for age and sex of population under investigation.

Years	Boys	Girls	Total (%)
2-4	39	56	95 (21.01)
5-7	68	79	147 (32.5)
8-10	88	109	197 (43.5)
11-12	8	5	13 (2.87)
Total	203	249	452

Most of the children belonged to socioeconomic class of upper lower 187 (41.37%). 57 belonged to upper middle class (12.6%), 135 (29.8%) belonged to lower middle class, 73 (16.1%) belonged to lower class.

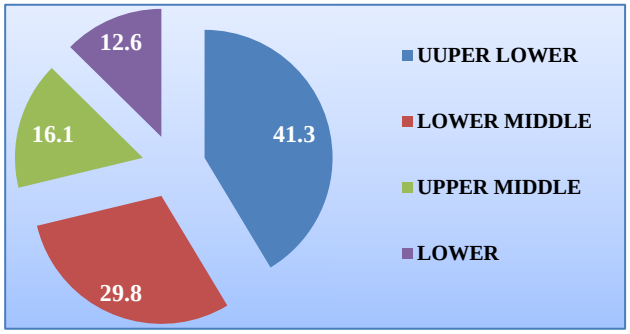

Figure 9: Distribution according to different socio-economic classes.

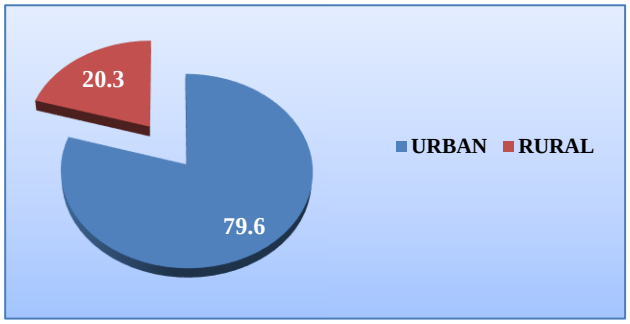

Figure 10: Distribution among differnt areas.

Locality

Most of the children belonged to rural locality n=360 (79.64%), 92 (20.35%) children belonged to urban locality.

Bowel habits

The average number of stools passed per day was 1.34. The predominant stool type passed was type IV n=225 (49.7%). Type I stool was not seen in any of the children, type II stool was passed by 38 (8.4%), type III stool was passed by 153 (33.8%), type V stool by 28 (6.1%) number of children. Type VI 3(0.6%) and type VII 5 (1.1%).

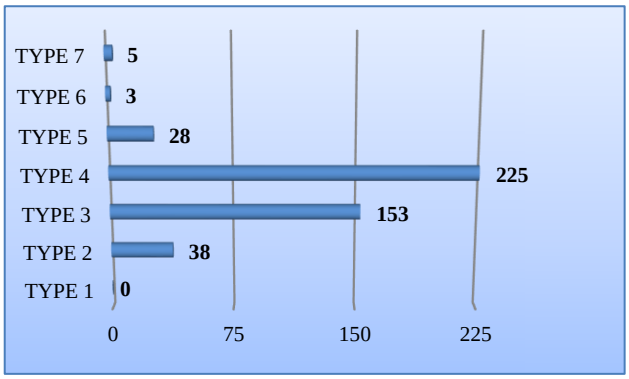

Figure 11: Distribution according to type of stool.

Toilet was located indoors in 206 (45.5%) and outdoors in 246 (54.4%) respectively.

Toilet practicing was observed in children mostly between 12 to 48 months. The average age of toilet practicing was 24.8 months.

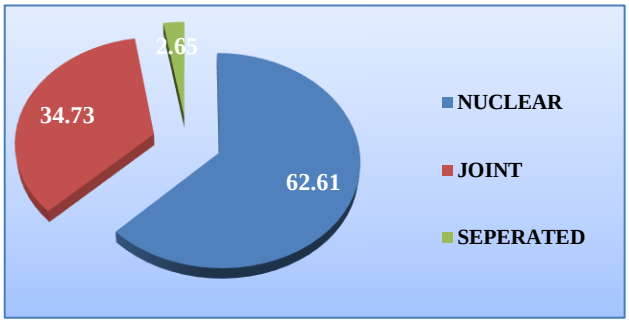

Figure 12: Distribution according to type of family.

283 (62.6%) children belonged to nuclear family. 157 (34.73%) belonged to joint family and 12 (2.6%) were from separated family.

Marital disharmony, sibling rivalry and tantrum were present in 49 (10.8%), 55 (12.1%), 140 (30.9%) of children respectively. School phobia and unwillingness to

use school toilet were found in 29 (6.4%), and 108 (23.8%) of children respectively.

Table 6: Psychological precipitants in normal bowel habit group.

Precipitants	Percentage (%)
Marital Dysharmony	10.8
Sibling Rivalry	12.1
Temper tantrum	30.9
School phobia	6.4
Aversion to use school toilet	23.8

The predominant diet was rice based. 418 (92.4%) children had regular breakfast. Vegetable and fruit intake was adequate in 331 (73.2%) and 358 (79.2%) of children. Junk food in the form of fried and baked items were found in 148 (32.7%) and 127 (28.9%) number of children respectively. Milk was consumed by n= 412 (91.1%) of children.

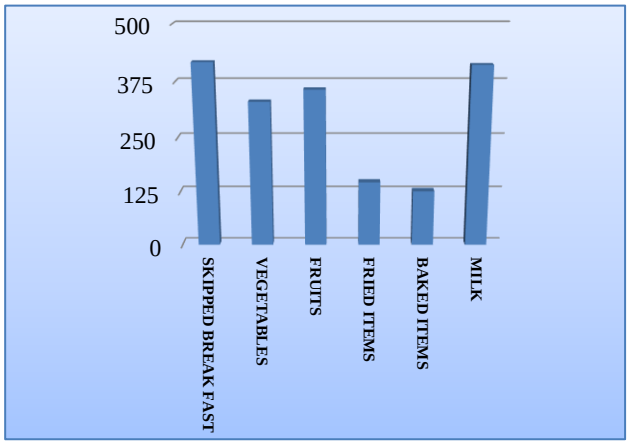

Figure 13: Diet patterns.

DISCUSSION

Out of 654 children, the prevalence of functional constipation based on the data in our study was found in 202 (30.88%), with a slight female preponderance (54.4%). The prevalence of constipation in school age children from USA was found to be 18% by Lorenzo et al, Loening-Baucke V et al found that the prevalence of constipation was equal in both boys and girls and it was 0.3% to 8% in pediatric population.[6,7] Similarly, Iacono et al and Ciampo D et al found the prevalence of constipation to be equal between girls and boys.[8,9] Ip et al and Kajiwara et al found an increased prevalence in girls 32% and 24.2% as compared to boys 21% and 13.2% respectively, similar to present study.[10,11] Kokkonen et al too showed more prevalence of constipation in girls.[12] Gannikou R et al found a slight male preponderance of constipation with 6.4% of boys being constipated as against 5.7% in girls.[13] Khanna et al also showed a male preponderance in functional constipation.[14] According to Agnarsson U et al constipation accounts for about 25% of a paediatric gastroenterologist's work and is one of the 10 most common problems seen by general paediatricians.[15]

The mean age of the constipated children in our study was 5.52 years which was comparable with the study conducted by Kokkonen et al where the mean age was 5.5 years. Lorenzo et al study found that peak incidence of constipation occurs at the time of toilet training between 2- 4 years of age, with an increased prevalence in boys. In present study also, constipation was more common in the age group of 2-4 years (57.4%).

In current study only 32 of the 202 children with functional constipation belonged to upper and upper middle class. The rest belonged to lower socioeconomic strata. This was similar to the systematic review done by Peppas in which constipation was found to be significantly higher in lower social class.[16]

58.4% of children with functional constipation had retentive behavior in the form of abnormal posturing in our study. Boys manifested with this symptom more than girls (52.5%). In the study of Khanna et al; withholding behavior was seen in 27.4%, which is significantly lesser than that of our study. Wald et al found retentive behavior to be more common in boys similar to ours.[17]

In this study, fecal soiling was present in 44.05% of children with slight female preponderance (n=48). Fecal soiling was 30.8% in the study conducted by Khanna et al. In the study by Wald et al; fecal soiling was more common in boys. Fecal soiling was observed in 84% of children at presentation by Voskuijl which was very high as compared to our study.[18] Kokkonen et al also showed a higher prevalence (62%) of fecal soiling in functional constipation.

In current study, recurrent abdominal pain was the presenting complaint in 30.6% of children, it was present equally in boys and girls (n=31). In the study conducted by Khanna et al;18.8% of children had abdominal pain. This is lower than ours. 26% of functional constipation children had abdominal pain in Kokkonen et al study comparable to our study.

Blood streaked stools were present in 10.89% of the children with functional Constipation in our study. In the study by Weaver et al 9% of children had blood streaked stools, similar to ours.[19] In the study of Khanna et al the prevalence of blood streaked stools was 24.8% more than double of present study.

Bowel movement per week in our study in the constipated group was 2.044. In Khanna et al study the bowel movement per week was 2.8 and was comparable to ours.

Toilet training was started at an average age of 16.19 months. According to Crofffie J coercive or inappropriate toilet training in a toddler not ready for toilet training

may lead to withholding and passage of dry hard stools and painful defecation.20 Raju B in his review article states that the ideal age for toilet training is between 2-3 years.[21] It seems to be relevance in the age of start of toilet training and occurrence of constipation.

Marital disharmony (23.2%), sibling rivalry (24.3%), and school phobia (10.8%) are present in constipated children in present study, but there are no studies to compare these results.

Lundblad et al in her study observed that 63% of school children do not use the school toilet to defecate.[22] 16% of them never urinate and 15% of children always try to avoid using the toilet. So, the author feels that there is a precarious, situation for school children undergoing treatment of bladder and bowel dysfunction. Moreover, irregular toilet habits are contributing factors to functional constipation. In this study, there was an aversion to use school toilet in 37.1%.

Irregular breakfast intake was present in 14.5%. There are no studies regarding this variable on functional constipation.

Childhood constipation is much more frequent when dietary fibre intake is restricted according to Araujo et al Ip et al found that dietary fibre intake was insufficient in all children and even lower in those with constipation, similar to present study.[23]

In present study the average number of bowel movements per day was 1.34, and predominantly children passed soft stools (type IV of Bristol stool chart) this was comparable to other studies. In the study by Wald et al found that most children between 5-8 years of age have medium size bowel movement daily or every other day without straining. According to the study done by Yong et al 96% of school children had a stool frequency between the range of three times a day and once in every 2 days.[24] Weaver and Steiner also found that 96% of 1-4 year old passed stools in the range of three times a day to every other day. At all age children passed soft stool though there was year by year increase in the passage of hard stools. The mean average of stool passed per day for 2 year old was 1.7 and became 1.2 stools per day at 4 years of age.

CONCLUSION

The significant prevalence of Functional constipation was seen in 30.8% in present study. In the present study, the common age of presentation of constipation is 2-4 years. As the age increases the incidence is decreasing significantly in boys than in girls.

The incidence of constipation is more in females; with female to male ratio is 1.1:1 probably because of lack of toilet facilities in low socio-economic families.

Functional constipation is more common in lower socioeconomic group. Functional constipation is also seen in significant number of school going children because of aversion to use school toilet. Psychological disorders like temper tantrum was observed in majority of children with constipation which requires urgent attention.

Marital disharmony, sibling rivalry and school phobia have an effect on functional constipation. High incidence of constipation in children is observed from nuclear families as against joint and separated families.

Lack of proper toilet practices is associated with functional constipation. Features like abdominal pain, UTI and GERD are observed in some cases. Blood streaked stools was also observed in significant number of constipated children. Encopresis (fecal soiling), is an associated feature observed in constipated children in our study.

Abnormal posturing while passing motion in constipated children is also observed. The incidence of constipation is more common in urban children than in rural children. Low intake of vegetables and fruits had a significant influence on functional constipation.

Skipping of breakfast is also seen as coincidental finding in some constipated children. The incidence of constipation was more in children who consumes junk food that includes fried and baked items. The average number of stool passed per day by children with normal bowel habit is 1.342 and it is mostly of soft in consistency.

Normal bowel pattern children have less incidence of precipitating factors compared to children with constipation. Normal bowel habit is noticed in children belonged to rural locality. It was also observed that consumption of fruits and vegetables were high in this group which has high fibre content.

Consumption of junk foods in the form of fried and baked items was lower in this group. Even though it appears to be simple problem, but it has lot of bearing on the parents. Parental harmony, practicing healthy nutritional habits and avoiding consumption of junk food will go a long way in solving the problem of constipation.

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

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