Subtypes and Symptomatology of Irritable Bowel Syndrome in Children and Adolescents: A School-based Survey Using Rome III Criteria

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Background/Aims
This study was conducted with objectives of assessing subtypes of irritable bowel syndrome (IBS) in children aged 10-16 years, their symptomatology and gender differences.

Methods
For this survey, 107 children who fulfilled Rome III criteria for IBS and 1,610 healthy controls were recruited from 8 randomly selected schools, in 4 provinces in Sri Lanka. Data was collected using a previously validated, self administered questionnaire.

Results
Constipation predominant, diarrhea predominant and mixed type IBS were almost equally distributed (27%-28%), while un-subtyped IBS had a lower prevalence (17.8%). IBS was more common in girls (59.8% vs 40.2% in boys, \( P = 0.001 \)). Bloating, flatulence, burping, headache and limb pain were significantly higher in affected children (\( P < 0.05 \)).

Conclusions
This study highlights the distribution of IBS subtypes among Sri Lankan children and adolescents and its female preponderance. This study also shows a higher prevalence of other intestinal-related and extraintestinal somatic symptoms among affected children.

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Key Words
Adolescent; Child; Gastrointestinal disorder; Habits; Irritable bowel syndrome

Introduction
Irritable bowel syndrome (IBS) is a functional gastrointestinal disease (FGID), characterized by abdominal pain and altered bowel habits. Available epidemiological studies have reported IBS in 7%-14% of school children.\(^1\)\(^2\) Office-based studies using Rome criteria have found IBS in 21%-45% of children with recurrent abdominal pain.\(^3\)^\(^4\) These studies have highlighted the high burden of the disease, both in the community and referral centres. Furthermore, IBS has a significant impact on quality of life of affected children.\(^5\)
Previous adult studies have demonstrated a higher prevalence of IBS in females. Furthermore, females seek health care for IBS more often than males. Gender difference in symptomatology and associated features has been overlooked in pediatric studies.

Altered bowel habits (altered bowel frequency and consistency) are among the cardinal features of IBS. Rome III criteria for adults have classified IBS in to constipation predominant IBS (IBS-C), diarrhea predominant IBS (IBS-D), mixed IBS (IBS-M) and unsubtyped IBS (IBS-U), depending on the stool consistency. However, such a classification has not been specified for IBS in children. Despite this, a recent study in children has sub-typed IBS to IBS-C, IBS-D, IBS-M and IBS-U using adult criteria. According to previous studies, the commonest IBS subtype seen in both children and adults was IBS-M.

Classification of IBS into relevant subgroup is important since clinical features and managements vary between different subtypes. Many recently developed drugs in adults were developed based on IBS subtype. For example; alosetron was developed to treat IBS-D, while linaclotide and lubiprostone were used to treat IBS-C. Therefore, it is fundamental to identify subtypes of IBS in children since most future treatment strategies will target on specific IBS subtype.

The current research was conducted with the objectives of characterizing subtypes of IBS in children and identifying gender differences in the symptomatology. To our knowledge, this is the first pediatric study to analyze bowel habits and symptom characteristics in different IBS subtypes.

**Materials and Methods**

This is an island-wide survey, conducted in 8 randomly selected schools, in 4 randomly selected provinces (out of 9 provinces) in Sri Lanka. In each school, 2 classes each were selected from academic years (grades) 6-11 (12 classes from each school). All students in selected classes, present during the day of the survey, were included.

Information regarding abdominal pain characteristics, bowel habits and associated symptoms were collected using a self administered questionnaire. The questionnaire was developed based on Rome III diagnostic questionnaire for pediatric functional gastrointestinal disorders and has previously been pretested for Sri Lankan children and used in an epidemiological survey. The questionnaire was in native language and easy to understand. School administration and parents were informed before the study and consents were obtained. The questionnaire was distributed in an examination setting to ensure confidentiality and privacy. Children were given unlimited time to fill the questionnaire and verifications were provided by research assistants.

IBS was diagnosed using Rome III criteria for pediatric FGID and subtyping was done using criteria described by Longstreth et al (Table 1).

Exclusion criteria were (1) functional gastrointestinal disorders other than IBS, (2) chronic disorders needing long term medication other than IBS, (3) disabled children, (4) children with learning difficulties and (5) children who had received drugs that modify bowel habits during previous month. Ethical Review Committee of the Sri Lanka College of pediatricians approved this study protocol.

**Statistical Methods**

Data were analysed using EpiInfo (EpiInfo 6, version 6.04 [1996]; Centres of Disease Control and Prevention, Atlanta, Georgia, USA and World Health Organization, Geneva, Switzerland.)