

## Investigating the Quality of Life of Children and Adolescents with Irritable Bowel Syndrome

Bahar Allahverdi <sup>1</sup>, Parisa Rahmani Ahranjani <sup>1</sup>, Hossein Alimadadi <sup>1</sup>, Masoumeh Asgar Shirazi <sup>2</sup>, \* Atieh Amini <sup>1</sup>

<sup>1</sup> Department of Gastroenterology, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran.

<sup>2</sup> Imam Khomeini Hospital, Tehran University of Medical Sciences, Tehran, Iran.

### Abstract

**Background:** The quality of life disruption in children with irritable bowel syndrome (IBS) has not been thoroughly studied.

**Objective:** We aim to evaluate the quality of life (QoL) of children with irritable bowel syndrome and investigate the underlying factors related to the occurrence of these disorders.

**Methods:** We examined seventy-one children suspected of suffering from IBS. We used the Pediatric Quality of Life inventory (PedsQL) to assess their QoL.

**Results:** The patients' QoL scores in the field of physical performance were  $48.59 \pm 5.42$ , in emotional state it was  $57.95 \pm 11.07$ , in social function it was  $58.59 \pm 12.16$ , and in educational performance it was  $56.76 \pm 12.13$ . The mental status of girls was more affected than that of boys, while the academic performance of boys was more affected than that of girls. Younger children had more defects in academic performance, while mental disorders were evident at older ages. Patients with abdominal pain had lower physical performance, those with diarrhea had lower social performance, and the incidence of loss of appetite had an inverse relationship with social performance score. The type of medication for IBS did not have a noticeable effect on QoL.

**Conclusion:** In Iranian children with IBS, various dimensions of QoL are severely disturbed. Gender, age and clinical manifestations are determinants of impaired QoL. However, routine treatments to control IBS may not be effective in improving or reducing the severity of quality of life.

**Key Words:** Child, Irritable bowel syndrome, Quality of life, Risk factor.

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### \*Corresponding Author:

Atieh Amini, Department of Gastroenterology, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran. Tel: 0098 921 0430981, Email: [atiehamini@gmail.com](mailto:atiehamini@gmail.com)

## 1- INTRODUCTION

According to the latest guidelines published by the World Gastroenterology Association Practice Guideline, irritable bowel syndrome (IBS) in children is a functional intestinal disease that presents with discomfort or abdominal pain associated with defecation. Clinical manifestations such as change in bowel habits, bloating and abdominal distension are common in children (1). Among many studies conducted among pediatric IBS patients, the quality of life (QoL) components are significantly affected by IBS (2). Abdominal discomfort, changes in bowel habits and the chronicity of this disease clearly affect the level of physical activity as well as the mental and psychological aspects of children's lives (3). Although in adults, the daily function disorder and the chronicity of the condition are among the most important factors affecting the patient's quality of life, it seems that the unpleasantness of common symptoms plays a stronger role in the QoL of affected children with IBS (4,5).

In total, various physical, psychological and social dimensions are involved in this field. Regarding physical involvement, abdominal pain is the initial symptom which can be chronic and debilitating, bloating and gas may cause discomfort and social embarrassment, and changes can interfere with daily activities (6). Regarding emotional and psychological effects, many children with IBS show higher levels of anxiety and depression (7). With respect to social functional state, fear of symptoms may lead to avoidance of social situations or school activities leading to social isolation (8). In addition, academic performance is adversely affected by IBS, as frequent absences and difficulty concentrating can affect school performance (9). Moreover, family dynamics may also be affected in such a way that stress will affect family relationships

due to caregiver roles and symptom management (10).

Overall, the management of IBS in pediatric patients is multifaceted and focuses on relieving symptoms and improving overall QoL. Early intervention and a supportive approach can help reduce its effects on physical, emotional and social health (11). Regular follow-up with healthcare professionals is essential for optimal management. Despite the many studies about this disease and the QoL among affected adults, there have been fewer studies about affected children focusing on the QoL of patients. In this study, we decided to investigate the QoL of children with IBS and its main determinants, for the first time in Iranian affected children.

## 2- MATERIALS AND METHODS

### 2-1. Study Population

This cross-sectional study was conducted on suspected IBS patients who were referred to either of the two gastroenterology clinics at Children's Medical Center or the Gastroenterology Clinic at Hazrat Valiasr Hospital between September 2018 and September 2019. The patients were examined to confirm the diagnosis of IBS. The inclusion criteria required a definitive diagnosis of IBS based on ROME IV criteria. Patients meeting the following criteria were excluded from the study: having other chronic diseases, both digestive and non-digestive, accompanying psychiatric issues diagnosed by a documented reference in the study population, and not providing consent to participate in the study. Written consent was obtained from all parents before their children participated in the study, and all research and ethical aspects of the study were approved by Tehran University of Medical Sciences.

### 2-2. Study measurements:

The patients' background information was collected by reviewing

the data entered into the hospital information registration system. This data included demographic characteristics such as gender and age, as well as the clinical manifestations, and treatment regimens used for the patients. Then, through contact with the patients, various dimensions of the patients' QoL were evaluated. In this context, the QoL questionnaire of children and adolescents called PedsQL was used. The purpose of creating this questionnaire is to evaluate the quality of life of children. This questionnaire is the fourth version of this questionnaire and it is suitable for ages 2 to 16 years. The QoL questionnaire has 23 questions and 4 components including physical performance, emotional performance, social performance and academic performance. Regarding the physical performance component, it is related to children's physical performance or QoL. The higher a child's ability in physical terms and physical functions, and the more physically healthy he is, the higher his QoL will be. In the emotional and psychological field, recognizing emotions and feelings in oneself and in others and performing well on an emotional level has a positive effect on the QoL. Regarding the component of social performance, in addition, if a child interacts with his peers and with others and can communicate well with others, he will probably experience a better quality of life. Finally, academic performance is directly related to QoL. The more academic abilities and successes the child has in school and the higher his academic involvement, the more likely the effect of this on the QoL will be evident. The questionnaire options are scored on a Likert scale ranging from never (score 0) to always (score 4). A general score and four subscales can be defined, with higher scores indicating a better QoL. In a study by Gheissari and colleagues, the reliability coefficient for this questionnaire among Iranian children was calculated at 0.78,

indicating the good reliability of the Persian version. Additionally, the face and content validity of the questionnaire were confirmed in Iranian children's society (63). Finally, the QoL of these patients was evaluated based on their background factors.

### 2-3. Statistical Analysis

To describe the data, frequency and percentage indices were used for qualitative variables, mean  $\pm$  standard deviation indices for quantitative variables with a normal distribution and median along with the interquartile range (IQR) for non-normal quantitative variables. The normal distribution, of the variables was checked using the Shapiro-Wilk test. To compare differences between groups, Fisher's exact test or the Chi-square test was used for qualitative variables, the independent t-test was used for normal quantitative variables, and the Mann-Whitney test was used for abnormal quantitative variables. The association of quantitative variables was assessed using Pearson's or Spearman's correlation test. In all tests, the significance level was set at five percent and statistical analysis was conducted using SPSS software.

### 3- RESULTS

In this study, a total of 71 patients were included. In terms of gender distribution, 45.1% were male and the average age of the patients was  $9.94 \pm 1.54$  years. In terms of race, 94.4% were Iranian and 5.6% were foreigners. Clinical manifestations included abdominal pain in 78.9%, diarrhea in 78.9%, constipation in 78.9%, loss of appetite in 81.7% and abdominal bloating in 88.7% of patients. Antispasmodic drugs were prescribed in 73.2%, antidiarrheal drugs in 74.6%, and laxatives in 63.4% of patients (Table 1). The QoL score of the patients in the field of physical function was  $48.59 \pm 5.42$ , in the field of mental and emotional status was  $57.95 \pm 11.07$ , in the field of social

function was  $58.59 \pm 12.16$  and in the field of academic performance was  $56.76 \pm 12.13$ . The total QoL score of the patients was estimated as  $55.47 \pm 4.56$  (Figure 1). The quality of life status in boys and girls is presented in Table 2. In boys and girls, the average QoL score in the field of physical performance was  $48.43 \pm 5.14$  and  $48.71 \pm 5.70$  ( $p = 0.830$ ), in the field of mental state was  $50.07 \pm 67.81$  and  $49.87 \pm 7.47$  ( $p = 0.001$ ), in social performance equal to  $55.46 \pm 12.13$  and  $61.15 \pm 11.72$  ( $p = 0.049$ ), and in education field was equal to  $47.34 \pm 5.81$  and  $64.48 \pm 10.37$  ( $p = 0.001$ ), respectively, which indicated no difference in the field of physical performance. However, boys in the field of mental state and girls in the field of social performance and education had reported a higher QoL score. Regarding the relationship between the QoL and the age of the patients, a direct significant

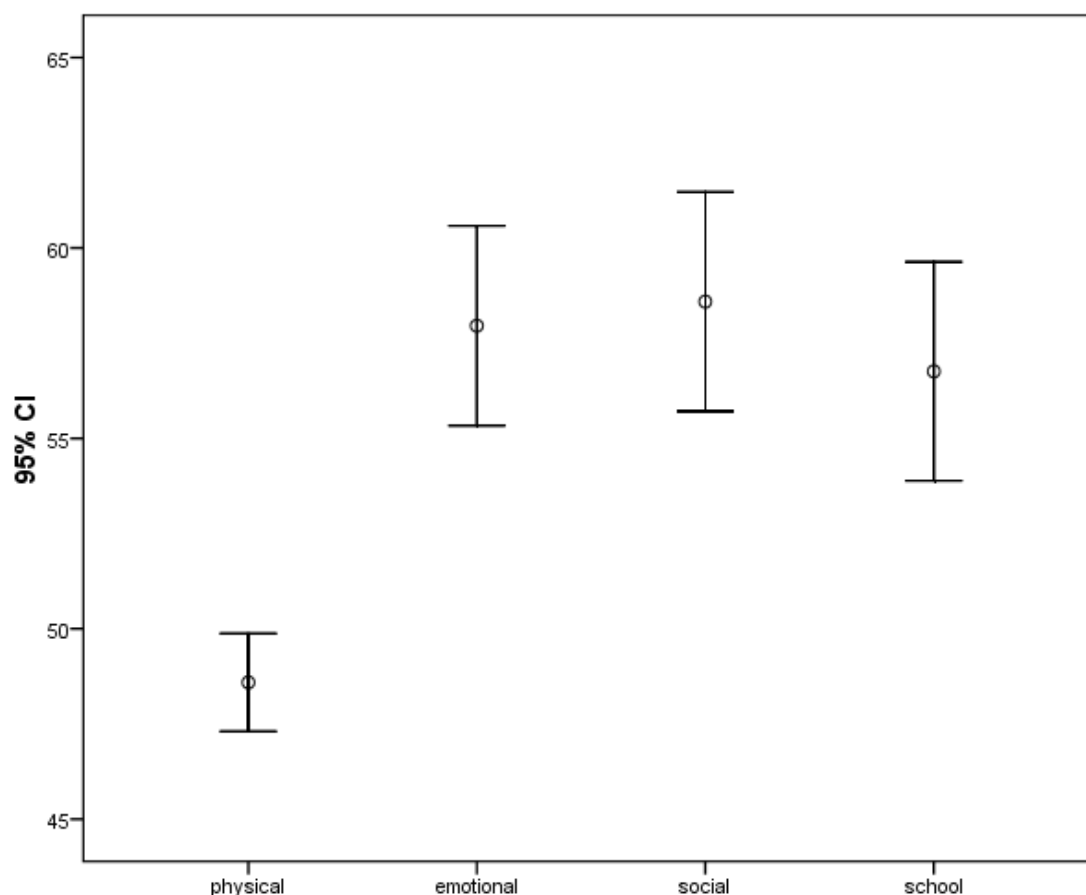
correlation was obtained between the age of the patients and the area of their academic performance (correlation coefficient equal to 0.545,  $p = 0.001$ ). Also, a significant but inverse correlation was obtained between the age of patients and their mental state (correlation coefficient equal to -0.419,  $p = 0.001$ ). However, the correlation between patients' age with physical function (correlation coefficient equal to -0.001,  $p = 0.993$ ) and social function (correlation coefficient equal to -0.004,  $p = 0.972$ ) was not significant. In terms of the relationship between clinical manifestations and patients' QoL score, patients with abdominal pain had a significantly lower physical performance score than other patients, but no relationship was found between abdominal pain and other areas of QoL.

**Table-1.** Background information of the studied patients.

<b>Sexual Distribution</b>	
Male	32 (45.1)
Female	39 (54.9)
Average age, years	$9.94 \pm 1.54$
<b>Race</b>	
Iranian	67 (94.4)
Afghan	4 (5.6)
<b>Clinical manifestations</b>	
Abdominal pain	56 (78.9)
Diarrhea	56 (78.9)
Constipation	56 (78.9)
Anorexia	58 (81.7)
Abdominal bloating	63 (88.7)
<b>Drug regimens</b>	
Antispasmodic drugs	52 (73.2)
Antidiarrheal drugs	53 (74.6)
Laxatives	45 (63.4)

**Table-2.** Quality of life components total and according to gender.

Item	Total	Males	Females	P value
Physical function	$48.59 \pm 5.42$	$48.43 \pm 5.14$	$48.71 \pm 5.70$	0.830
Mental state	$57.95 \pm 11.07$	$67.81 \pm 5.07$	$49.87 \pm 7.47$	0.001
Social function	$58.59 \pm 12.16$	$55.46 \pm 12.13$	$61.15 \pm 11.72$	0.049
Education performance	$56.76 \pm 12.13$	$47.34 \pm 5.81$	$64.48 \pm 10.37$	0.001



**Figure-1.** The quality of life component scores in children with IBS.

Patients with diarrhea had a significantly lower social function score than other patients, but no relationship between diarrhea and patients' QoL was observed in other domains. No statistically significant relationship was observed between constipation and patients' QoL. The incidence of anorexia also had a significant but inverse relationship with the social performance score of the patients. Also, there was no relationship between the incidence of abdominal bloating and any of the domains of the patients' QoL. Regarding the relationship between the QoL scores of the patients and the drug treatments, none of the treatments had a relationship with the QoL scores of the patients in any of the QoL domains (Table 3).

#### 4- DISCUSSION

#### 4-1. Summary of Key Findings:

This study highlights significant impairments in multiple dimensions of quality of life among children with IBS. The findings indicate that mental health is more impacted in girls, while academic performance is more affected in boys. Additionally, younger children showed lower academic performance, while older children faced greater mental health challenges. The following discussion will delve into these findings and their clinical implications.

Gastrointestinal disorders, regardless of etiology and mechanism, have significant effects on people's performance, especially among children, and can be associated with significant morbidity as well as disturbances in various dimensions of their lives. This issue is particularly evident in the case of disorders such as IBS due to

the lack of accurate understanding of the disease's pathophysiology and its diverse and disturbing manifestations. However, the various dimensions of the disorder in the quality of life of children with this disease have not been studied in detail, especially since the underlying factors related to the occurrence of these disorders have not been fully explored yet. The present study evaluates the quality of life of children with irritable bowel syndrome and investigates underlying factors related to the occurrence of these disorders.

One of the most important findings of this study was the very low level of QoL among children with IBS. The average scores of the dimensions of different areas of their QoL ranged from 48 to 58 out of a total score of 100, indicating a significant gap between these scores and the desired level of QoL. Among these scores, physical performance had the lowest score, followed by academic performance. Regarding the relationship between the level of various aspects of the patients' QoL and background characteristics, firstly, the mental and psychological status of affected girls was more affected than that of boys, while the academic performance of boys was more affected

than that of girls. In relation to the age of the patients, children at a younger age had more disorders in academic performance, while mental disorders were evident at older ages. In relation to the relationship between clinical manifestations and various aspects of patients' QoL, patients with abdominal pain had a far lower physical performance score than other patients, patients with diarrhea had a significantly lower social performance score than other patients, and also the incidence of anorexia also had a significant but inverse relationship with the social performance score of the patients. But a particularly noteworthy finding of this study was that drug treatments for IBS did not have a noticeable effect on the different aspects of the QoL of these patients. Limited studies have investigated the QoL of children with IBS and the effective factors related to it. These studies have emphasized the negative impact of this disorder on various dimensions of QoL. In the study by Varni et al (12), pediatric patients with IBS showed significant impairment in physical, emotional, social, and school functioning compared to healthy children.

**Table-3.** Quality of life components according to types of medications.

Item	Physical function	Mental state	Social function	Education performance
<b>Antispasmodic</b>				
Positive	49.03±5.60	57.21±10.54	59.03±12.83	57.40±12.11
Negative	47.36±4.82	60.00±12.47	57.36±10.32	55.00±12.36
P value	0.254	0.351	0.612	0.464
<b>Antidiarrheal</b>				
Positive	48.96±5.49	57.83±10.85	58.49±12.88	57.07±11.91
Negative	47.50±5.21	58.33±12.00	58.88±10.06	55.83±13.08
P value	0.327	0.869	0.905	0.710
<b>Laxatives</b>				
Positive	48.22±5.45	58.22±10.87	58.22±12.62	57.00±11.98
Negative	49.23±5.42	57.50±11.59	59.23±11.54	56.34±12.61
P value	0.454	0.793	0.839	0.729

According to the present study, reported gastrointestinal symptoms were significantly associated with the level of impairment in patients' QoL. Additionally, patients with IBS had more days absent from school than healthy children. In the study by Sjölund et al (13), children with IBS compared to children without IBS at the ages of 16 and 24 years, the QoL score of the patients was much lower, and what was more interesting was that having IBS at the age of 16 years had a significant impact on anxiety at an older age. Hollier's et al study (14), confirmed the relationship between abdominal pain and psychosocial distress. In his study, functional disability was the most severe disorder in IBS, and after that, psychosocial aspects were also severely impaired (60). In the study of Kesuma et al (15), various aspects of the patients' QoL were significantly impaired. In the study of Sagawa et al (16), the QoL score in patients with IBS was significantly worse than in patients without this complication.

The fact that in our study population, which consisted of Iranian children and adolescents with IBS, we observed a high QoL disorder indicates that the physical and psychological management of these patients seems to be very successful in our patient population. However, it suggests that good management approaches in different areas of patients' QoL, especially in children, may be lacking. Perhaps, social and economic problems in society can also be the cause. This issue takes on more color when the use of anti-IBS drugs have not significantly improved on various aspects of children's QoL, and in fact, it seems that non-pharmacological approaches, including psychological and social support and providing psychological counseling and Education along with physical rehabilitation of these patients will be more effective than pharmaceutical approaches in improving their QoL.

Another important point was the impact of background factors on the QoL of patients. In this regard, girls are more likely to suffer from psychological changes due to their more fragile spirit and higher hormonal changes due to such diseases. Also, it is obvious that some levels of QoL are affected by clinical manifestations such as abdominal pain, diarrhea, or anorexia (especially after social functioning), because the occurrence of such clinical symptoms, especially in severe cases, can lead to social isolation of children.

The most significant advantage of the present study was that it was the first to evaluate the relationship between background characteristics and clinical symptoms with impairment in various aspects of the QoL of children with IBS. However, the small sample size of the study and the lack of long-term follow-up of patients are potential limitations.

## **5- CONCLUSION**

### **5-1. Study Limitations**

This study has several limitations. Firstly, its cross-sectional design restricts causal inference and does not allow for tracking changes in quality of life over time. Future longitudinal studies are needed to assess these variations.

Secondly, the sample was drawn from two specialized pediatric gastroenterology clinics, which may introduce selection bias and limit the generalizability of findings.

Thirdly, the absence of follow-up data hinders the evaluation of long-term quality of life trends. Future research should incorporate periodic assessments for a more comprehensive understanding.

In conclusion, in Iranian children with IBS, various dimensions of QoL are severely disturbed, and this disturbance is more evident in the field of physical performance. Factors such as gender (mental disorders in girls and academic performance in boys), older age (mental

disorder and academic performance) and clinical manifestations (decreased social functioning following symptoms like abdominal pain, diarrhea and anorexia) impact the severity of quality impairment in patients' lives. However, it appears that routine treatments for controlling IBS have not been effective in improving the severity or QoL of patients.

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