HEALTH-RELATED QUALITY OF LIFE AND ASSOCIATED FACTORS IN CHILDREN WITH CROHN'S DISEASE AT VIETNAM NATIONAL CHILDREN'S HOSPITAL

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Health-related quality of life (HRQoL) is increasingly recognized as one of the goals of holistic healthcare. Crohn's disease is the most common inflammatory bowel disease that necessitates long-term management and increases the risk of psychological distress and social disruption, leading to impaired HRQoL in comparison to healthy controls. We administered the PedsQLTM 4.0 scale to 40 children aged 2 to 17 years with Crohn's disease and their parents to evaluate the HRQoL of patients and define the variables that impact these individuals. Our study indicated that children with Crohn's disease experienced a decrease in their HRQoL in school functioning. We found that factors related to decreased quality of life in these patients included gender (female), stunting, living in low-income families, higher disease activity index, and undergoing surgical intervention.

Keywords: Health-related quality of life, associated factors, crohn's disease children.

I. INTRODUCTION

Health-related quality of life (HRQoL) is increasingly recognized as one of the goals of holistic healthcare.[1,2] Studies on HRQoL are significant for they:

1) Provide a more comprehensive understanding of the burden of the ailment as well as treatment effectiveness.[2];

2) Determine thoroughly how diseases, medical conditions, or treatments affect an individual's life in a correct and specific manner.[3,4]; and

3) Serve as an important indicator to evaluate disease burden, which assists in providing outcomes on children's physical activity, cognitive ability, social relationship quality, and academic success.[3,4]

From there, doctors, parents, and the community can have timely interventions to reduce detrimental impacts from diseases and treatments on children's physical and mental development.

Crohn's disease is the most common inflammatory bowel disease, followed by ulcerative colitis and unclassified inflammatory bowel disease.[5] It is a chronic disease that necessitates long-term management, with clinical symptoms such as abdominal pain, prolonged bowel disorder causing discomfort, poor health, frequently missing school for periodic re-examinations, and hospitalizations when the condition recurs. In addition, the reduced absorption of nutrients, anemia, and delayed physical growth often make children feel insecure about their appearance, limiting their daily, social and academic activities. All these factors contribute to the decreased HRQoL of affected children. Several previous studies across the globe show that the HRQoL of children with Crohn's disease is not only

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lower than the overall population level, but also lower compared to numerous other chronic diseases.[6] To the best of our knowledge, there has been no published research on this issue in Vietnam, therefore we conducted this study to evaluate the HRQoL and associated factors in Vietnamese children with Crohn's disease. We chose the PedsQLTM 4.0 questionnaire in our research since it was widely applied in many studies worldwide, proven to be effective and highly reliable in children. This questionnaire has been standardized and applied to Vietnamese children.[7,8]

II. MATERIALS AND METHODS

1. Participants

The study was performed at Vietnam National Children's Hospital in Hanoi, Vietnam from October 1, 2022, to April 1, 2023. The inclusion and exclusion criteria were as follows

Inclusion criteria:

Children aged 2-17 years were diagnosed Crohn's disease according to Porto criteria 2014[5] for at least 3 months and their parents.

These children were closely followed-up and treated at the Department of Gastroenterology, Vietnam National Children's Hospital. Necessary lab tests must be performed and children must follow the treatment regimen and attend follow-up appointments.

Children and their parents consent to participate in the study.

Exclusion criteria:

Children or their parents are unable to communicate due to conditions affecting cognition, such as deafness, cerebral palsy, autism, or mental-motor retardation.

Children with coexisting chronic illnesses that significantly affect HRQoL, such as cancer, diabetes, bronchial asthma, and so on.

2. Methods

Study design: This was a descriptive cross-sectional study. 40 child-parent pairs were recruited by convenient sampling.

Variables: *Demographic and socio-economic information* (age, gender, ethnicity, living region, family economic condition). *Disease-related information* (age of symptom onset, time for diagnosis, disease duration, lesions beyond the GI tract, disease activity index (PCDAI), weight, height, hemoglobin concentration, number of drugs being used, surgical treatment, using biological drugs). *HRQoL score* (physical, emotional, social and school functioning).

Procedure: Data were gathered using a pre-designed study case form. The researcher inquired about the children's personal information and illnesses, examined the laboratory test findings in the medical records. Then, we conducted interviews to assess the HRQoL of the children using the PedsQL^{TM} 4.0 scale.[7] This scale includes 23 questions in 4 areas: physical functioning (8 questions), emotional functioning (5 questions), social functioning (5 questions) and school functioning (5 questions). The answers are rated on a five-point scale (0=never, 1=almost never, 2=sometimes, 3=often, 4=almost always). The items are inversely scored and transposed on a 0 to 100 scale (0=100, 1=75, 2=50, 3=25, 4=0). Thus, the greater the score, the higher the quality of life. The total score is a sum of points across all four dimensions evaluated. The PedsQL^{TM} 4.0 scale was used to rate a child's difficulty in these four areas within the past month, by interviewing the child (Self-Report version) and/or the child's parent (Parent-Proxy Report version). For children aged 2-4, we only interviewed the child's parent. For children aged 5-17, we interviewed the child and their parent independently.

Statistical analysis: The information obtained from the study was processed according to the biomedical statistical algorithm on SPSS 20.0 software. The difference was statistically significant when the p-value was < 0.05. We calculated the mean (SD) or median (IQR) for quantitative variables and frequency (percentage) for qualitative variables in descriptive statistics. Comparing two independent groups with the mean of HRQoL score by T-test and the difference was statistically significant when the p-value was < 0.05.

3. Research ethics

Written informed consent was obtained for each child involved in the study, either from the parents alone or from both parents and children. The study protocol was submitted to and approved by the scientific council of Hanoi Medical University and the ethics committee of the Vietnam National Children's Hospital (No.286/BVNTW-HĐĐĐ).

III. RESULTS

We collected 40 eligible pediatric patients between October 1, 2022, and April 1, 2023. The general characteristics of patients in the study are described below.

Table 1. General characteristics of pediatric patients in the study

		Number of patients	Percentage (%)
Age	2 - 4 years old	6	15
	5 - 7 years old	4	10
	8 - 12 years old	10	25
	13 - 17 years old	20	50
Gender	Boy	23	57.5
	Girl	17	42.5
Age at symptom onset	Very early onset (0 - <6 yo)	11	27.5
	Early onset (6 - 17 yo)	29	72.5
Time for diagnosis	<12 months	33	82.5
	12-24 months	4	10
	>24 months	3	7.5
Disease duration	Under 5 years	35	87.5
	≥5 years	5	12.5
Disease activity index (PCDAI)	Remission or Mild	34	85
	Moderate or Severe	6	15

Up to 50% of patients in our study were 13 years of age or older. There were more male patients (57.5%) than female patients (42.5%). 27.5% children had Crohn's before six years old. 82.5% were diagnosed in less than 12 months (from the onset of symptoms to the time of conclusive Crohn's disease diagnosis); 10% of patients were diagnosed after 12-24 months or over 24 months (7.5%). Generally, pediatric patients in the study had a disease progression time of less than 5 years (87.5%) and had mild disease activity or remission (85%).

Table 2. HRQoL scores of children with Crohn's disease by age groups

	2-4 yo (Mean ± SD)	5-7 yo (Mean ± SD)			8-12 yo (Mean ± SD)			13-17 yo Mean ± SD)		
		Self-Report	Parent-Proxy Report	p-value	Self-Report	Parent-Proxy Report	p-value	Self-Report	Parent-Proxy Report	p-value
Physical Functioning	89.58 ± 10.01	75.78 ± 20.47	84.38 ± 5.7	0.367	87.81 ± 6.82	79.06 ± 16.07	0.079	81.88 ± 11.72	75.75 ± 18.57	**0.027**
Emotional Functioning	75.83 ± 18	77.5 ± 9.57	73.75 ± 12.5	0.391	86 ± 11.5	82 ± 13.17	0.387	82 ± 14.55	80.25 ± 13.91	0.496
Social Functioning	76.67 ± 22.29	83.75 ± 11.09	75 ± 17.8	0.256	88 ± 15.85	83 ± 9.2	0.349	87.25 ± 9.52	80,5 ± 14.41	**0.015**
School Functioning	63.33 ± 15.28	60 ± 25.82	65 ±24.83	0.092	75.5 ± 14.62	72,5 ± 10.34	0.496	73 ± 13.99	71.5 ± 14.61	0.584
Total HRQoL score	80.1 ± 10.27	74.46 ± 14.81	75.82 ± 12.34	0.684	84.89 ± 8.85	79.13 ± 6.62	0.127	81.14 ± 10.37	76.96 ± 12.71	**0.018**

T-Test, p<0.05

The HRQoL score of patients was lowest in the school functioning domain, as evaluated by both the child and their parent. In the 13-17 years age group, there were statistically significant differences in the physical functioning domain, social functioning domain, and total HRQoL scores with p-values of 0.027, 0.015, and 0.018 respectively, with higher scores reported by the children than those reported by their parents in all three sectors.

Table 3. Relationship between HRQoL (self-report version) and demographic and socio-economic factors

		Physical Functioning		Emotional Functioning		Social Functioning		School Functioning		Total HRQoL score	
		Mean ±SD	**P - value**	**Mean ± SD**	**P - value**	**Mean ± SD**	**P - value**	**Mean ±SD**	**P - value**	**Mean ±SD**	**P - value**
Age group	5-12 (n=14)	84.38 ± 12.68	0.558	83.57 ± 11.34	0.738	86.79 ± 14.36	0.910	71.07 ± 18.83	0.734	81.91 ± 11.35	0.839
	13-17 (n=20)	81.88 ± 11.72		82 ± 14.55		87.25 ± 9.52		73 ± 13.99		81.14 ± 10.37	
Gender	Boy (n=20)	86.09 ± 6.91	0.108	88.25 ± 8.63	**0.006**	88 ± 13.12	0.578	75.25 ± 14.46	0.187	84.62 ± 8.07	**0.036**
	Girl (n=14)	78.35 ± 16.05		74.64 ± 14.61		85.71 ± 9.17		67.86 ± 17.4		76.94 ± 12.40	
Ethnicity	Kinh (n=29)	84.16 ± 12.36	0.144	83.28 ± 13.11	0.511	87.93 ± 12.07	0.296	73.79 ± 15.16	0.165	82.57 ± 10.67	0.144
	Others (n=5)	75.63 ± 6.4		79 ± 14.32		82 ± 6.71		63 ± 18.91		75 ± 8.59	
Living Region	Urban (n=19)	82.89 ± 12.94	0.996	79.47 ± 14.33	0.115	87.63 ± 9.63	0.750	75.26 ± 18.29	0.212	81.58 ± 11.55	0.942
	Rural (n=15)	82.92 ± 11.13		86.67 ± 10.63		86.33 ± 13.95		68.33 ± 11.75		81.3 ± 9.72	
Family's economic condition	Very low/ low income (n=4)	70.31 ± 12.63	**0.023**	80 ± 8.16	0.675	80 ± 7.07	0.198	65 ± 17.8	0.343	73.37 ± 9.94	0.106
	Others (=30)	84.58 ± 11.07		83 ± 13.75		88 ± 11.79		73.17 ± 15.73		82.54 ± 10.39	

T-Test, $p<0.05$

In the demographic and socio-economic factors, there were statistically significant differences in HRQoL between the genders in the emotional functioning domain, and total HRQoL score, with the female group scoring lower in those sectors (p<0.05). In addition, we also found a statistically significant difference in the physical functioning domain between two groups of children with different family economic conditions, namely, children living in very low or low-income families had lower HRQoL than those from better economic backgrounds (p<0.05).

Table 4. Relationship between HRQoL (self-report version) and disease-related factors

		Physical Functioning		Emotional Functioning		Social Functioning		School Functioning		Total HRQoL score	
		Mean ±SD	P-value	Mean ± SD	P-value	Mean ± SD	P-value	Mean ±SD	P-value	Mean ±SD	P-value
Age at symptom onset	Very early (n=5)	76.88 ± 17.9	0.229	80 ± 10	0.634	83 ± 9.75	0.403	61 ± 22.47	0.088	75.43 ± 13.01	0.174
	Early (n=29)	83.94 ± 10.78		83.1 ± 13.72		87.76 ± 11.85		74.14 ± 14.15		82.5 ± 10.06	

		Physical Functioning		Emotional Functioning		Social Functioning		School Functioning		Total HRQoL score	
		Mean ±SD	P-value	Mean ± SD	P-value	Mean ± SD	P-value	Mean ±SD	P-value	Mean ±SD	P-value
Time for diagnosis	<12months (n=28)	84.04 ± 11.64	0.357	83.75 ± 12.07	0.205	88.39 ± 11.63	0.877	72.14 ± 16.8	0.276	82.38 ± 10.53	0.854
	12-24months (n= 3)	7.,96 ± 19.09		80 ± 10		85 ± 8.66		75 ± 18.03		77.9 ± 13.98	
	>24months (n=3)	81.25 ± 6.25		75 ± 25.98		76.67 ± 10.41		70 ± 5		76.45 ± 1001	
Disease duration	< 5 years (n=29)	83.62 ± 10.85	0.410	83.28 ± 12.84	0.511	87.59 ± 11.92	0.530	73.28 ± 15.48	0.353	82.2 ± 9.97	0.337
	>= 5 years (n=5)	78.75 ± 18.41		79 ± 15.97		84 ± 9.62		66 ± 18.84		77.17 ± 14.42	
Lesions beyond the GI tract	No (n= 20)	85.16 ± 8.77	0.243	84.25 ± 13.5	0.404	86.5 ± 13.19	0.742	74.25 ± 13.89	0.379	82.88 ± 9.46	0.359
	Yes (n=14)	79.69 ± 15.3		80.36 ± 12.78		87.86 ± 9.14		69.29 ± 18.59		79.43 ± 12.17	
Disease activity index	Remission or Mild (n=29)	85.67 ± 9.17	**0.001**	84.48 ± 12.84	0.048	89.66 ± 8.76	**0.001**	75.86 ± 13.03	**0.001**	83.18 ± 8.32	**0.000**
	Moderate or Severe(n=5)	66.88 ± 14.92		72 ± 10.37		72 ± 15.25		51 ± 15.57		65.65 ± 8.98	
Anemia	No (n=22)	85.94 ± 8.45	0.097	85.22 ± 10.85	0.123	89.32 ± 7.12	0.224	75 ± 12.44	0.240	84.14 ± 7.17	0.103
	Yes (n=12)	77.34 ± 15.6		77.92 ± 16.02		82.92 ± 16.58		67.08 ± 20.5		76.54 ± 14.13	

		Physical Functioning		Emotional Functioning		Social Functioning		School Functioning		Total HRQoL score	
		Mean ±SD	P-value	Mean ± SD	P-value	Mean ± SD	P-value	Mean ±SD	P-value	Mean ±SD	P-value
Height	Normal (n= 21)	87.8 ± 7.52	**0.007**	85.48 ± 9.07	0.175	87.38 ± 12.21	0.84	75.48 ± 14.13	0.130	84.58 ± 7.87	**0.027**
	Stuning (n=13)	75 ± 13.86		78.08 ± 17.39		86.54 ± 10.88		66.92 ± 17.74		76.42 ± 12.75	
Weight	Normal (n= 24)	85.03 ± 9.21	0.218	83.54 ±11.37	0.547	87.92 ± 11.79	0.511	74.17 ± 15.51	0.272	83.02 ± 9.06	0.189
	Under-weight (n=10)	77.81 ± 16.44		80.5 ± 17.23		85 ± 11.3		67.5 ± 16.71		77.72 ± 13.49	

T-Test, p<0.05

About disease - related factors, children with mild disease or remission had better quality of life in all domains of the scale compared to those with moderate to severe disease activity ($p < 0.01$). In addition, there were also statistically significant differences in the physical functioning domain and total HRQoL between the normal children and the stunted children, with the stunted children having a lower scores than the normal children ($p<0.05$).

Table 5. Relationship between HRQoL (self-report version) and treatment – related factors

		Physical Functioning		Emotional Functioning		Social Functioning		School Functioning		Total HRQoL score	
		Mean ±SD	P-value	Mean ± SD	P-value	Mean ± SD	P-value	Mean ±SD	P-value	Mean ±SD	P-value
Number of drugs being used	≤ 2 types (n=32)	83.89 ± 11.11	0.055	82.81 ± 13.32	0.774	87.66 ± 11.64	0.233	72.97 ± 16.06	0.27	82.13 ± 10.36	0.141
	>=3 types (n=2)	67.19 ± 19.89		80 ± 14.14		77.5 ± 3.54		60 ± 7.07		70.65 ± 12.3	

		Physical Functioning		Emotional Functioning		Social Functioning		School Functioning		Total HRQoL score	
		Mean ±SD	**P-value**	**Mean ± SD**	**P-value**	**Mean ± SD**	**P-value**	**Mean ±SD**	**P-value**	**Mean ±SD**	**P-value**
Using biological drugs	Yes (n=16)	79.3 ± 14.15	0.099	80.63 ± 14	0.407	85.31 ± 9,91	0.414	67.5 ± 15.49	0.105	78.4 ± 11.32	0.114
	No (n= 18)	86.11 ± 8.92		84.44 ± 12.47		88.61 ± 12.93		76.39 ± 15.51		84.18 ± 9.46	
Surgical treatment	Yes (n=5)	71.25 ± 15.53	**0.016**	79 ± 11.4	0.511	84 ± 9.62	0.530	57 ± 18.57	**0.018**	72.61 ± 12.73	**0.042**
	No (n=29)	84.91 ± 10.33		83.28 ± 13.51		87.59 ± 11.92		74.83 ± 14.17		82.98 ± 9.67	

T-Test, p<0.05

In terms of treatment-related factors, there were statistically significant differences in these domains: physical functioning, school functioning, and total HRQoL between the group of children who hadn't have surgery yet and the group of children who had undergone surgery, with children who had surgery having lower score (p<0.05).

IV. DISCUSSION

Quality of life is defined by the WHO as "individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept incorporating in a complex way the persons' physical health, psychological state, level of independence, social relationships, personal beliefs and their relationships to salient features of the environment."[9]

The study was conducted on 40 children diagnosed with Crohn's disease, of whom 57.5% were male, with a male-to-female ratio of 1.35. This finding was similar to the report in France by Anne Gourdonneau et al, who studied 218 children with Crohn's disease, of whom 58% were male.[10] Another study by Robyn Lewis Claar et al on 116 children with Crohn's disease found that 57.5% were male.[11] Approximately 30% of patients had a very early onset of the disease before the age of 6, while the rest had an early onset after the age of 6. The proportion of patients with very early-onset disease in our study was higher than the 15.1% reported by Melvin B. Heyman et al in the United States.[12]

All children with Crohn's disease and their parents were surveyed to evaluate the health-related quality of life of the children using the PedsQL^{TM} 4.0 questionnaire, except for children aged 2-4 who were only surveyed through their parents. Scores were converted to a scale of 100, with higher scores indicating better quality of life. The study results showed that the information reported by children under 12 years old and by their parents share similarity across all components of the PedsQL^{TM} 4.0 scale, with no statistically significant difference. This finding suggested and supported that for younger children, we can indirectly evaluate their quality of life through the information provided by their parents and still obtain reliable results. However, this is not entirely true for older children. There were statistically significant differences in the results reported by children themselves and by their parents in three out of five components of the scale (physical functioning, social functioning, and total HRQoL score). This may be because older children are more likely to be more independent, and self-sufficient in their daily life, school life, and personal affairs. Therefore, there are aspects and issues that their parents may have difficulty understanding and comprehending, leading to different reported scores.

The total HRQoL score of patients with Crohn's disease in our study varied in all ages, with the lowest score reported in the age group 5-7 years old (**Table 2**). The average total HRQoL score in the entire study population was 81.25 ± 10.45 (calculated mainly based on results reported by children). This result was higher than those in some other studies. The differences in sample size, timing of the study implementation, as well as the location of the study, can be reasons for the variations in the results of HRQoL score. Specifically, Matthew Smyth (2021) in Canada, using the PedsQoL 4.0 questionnaire to evaluate health-related quality of life in 351 children with inflammatory bowel disease (229 with Crohn's disease) aged 8-18, reported an average total HRQoL score of 79.74 for Crohn's disease patients.[6] Another research conducted by Larissa Caetano Silva (2020) in Brazil, also used the PedsQoL questionnaire to assess HRQoL in 35 children with inflammatory bowel disease (17 with Crohn's disease) aged 3-18, found that the average total HRQoL score for Crohn's disease patients was only 60.4.[13] However, when compared to healthy Vietnamese children reported in a study by Nguyen Thi Thanh Mai et al (2017), children with Crohn's disease had lower total HRQoL scores in both the self-report and parent-proxy report versions.[8] This was consistent with the findings of Matthew Smyth (2021) and Larissa Caetano Silva (2020).[6,13] Specifically, in Matthew Smyth's study (2021), the authors also pointed out that not only did children with Crohn's disease have lower total HRQoL scores than the healthy control group, but their scores were also lower than those of some other chronic diseases such as Henoch-Schönlein purpura and type 1 diabetes.[6]

In more detail, when evaluating specific domains in the scale, we found that school functioning was the sector in that patients had the most decline in HRQoL. This result was the same as a report by Jennifer Hauser Kunz et al (2010) in the United States. The authors used the PedsQoL 4.0 questionnaire to evaluate the quality of life of 136 children with inflammatory bowel disease, including 100 with Crohn's disease.[14] Results from both the self-report and parent-proxy report versions showed that school functioning was the sector with the most significant decline, with scores of 68.92 ± 15.61 and 75.15 ± 20.27, respectively. These results showed that Crohn's disease significantly impacts a child's academic performance. Prolonged digestive symptoms affect the child's health and concentration during the learning process, and having to miss school for regular checkups or hospitalizations during disease relapses are contributing factors that affect the child's ability to learn.

Indeed, there are many factors related to and affecting the quality of life of children with Crohn's disease in particular and children with inflammatory bowel disease in general. In the present study, we also found some factors related to patient's health-related quality of life (self-report version). Among the demographic and socio-economic factors, the gender of the child was a related factor, as male children had statistically significantly higher total HRQoL as well as emotional functioning than female children, with p-values of 0.036 and 0.006, respectively (**Table 3**). This result was consistent with reports by Larissa Caetano Silva et al. (2020) in Brazil and Matthew Smyth et al. (2021) in Canada.[6,13] In addition, the family's economic condition also had a role, as children from low-income families (poor or nearly poor) had lower scores in physical functioning compared to those from better economic backgrounds with a statistically significant difference of p=0.023. Children are growing bodies, and most of their activities such as playing, eating, and learning depend on their parents, caregivers, and siblings in the family. Therefore, the psychological status of the parents, the relationships between family members or economic condition greatly affects the thoughts, emotions, and level of care for children. Especially in chronic diseases such as inflammatory bowel disease, the role of the family is even more emphasized. Research conducted by Michael Heizer on sixty-two adolescents, aged 13-17 years, with a confirmed diagnosis of with inflammatory bowel disease showed that adolescents from families with clinically elevated difficulties in problem solving, communication, and general family functioning endorsed lower HRQoL after statistically controlling the effects of disease severity and diagnosis.[15] Actually, the role that family, both parents and siblings, plays in the HRQoL of pediatric inflammatory bowel disease is just starting to be explored in recent years. Multiple areas need to be addressed and studied further.

Among disease - related factors, we found a correlation between disease activity and quality of life. In detail, children with mild disease activity or remission had better quality of life in all domains of the scale compared to those with moderate to severe disease activity. Several other studies have also reported similar results. In their study, Matthew Smyth (2021) concluded that disease activity was the most powerful independent factor affecting HRQoL. The stronger the disease activity, the lower the HRQoL (p<0.001).[6] These findings were also demonstrated in another study by Larissa Caetano Silva et al (2020).[13] The IMPACT-III questionnaire, a disease-specific instrument for assessing the quality of life in inflammatory bowel disease patients, was used for surveys. Simona Gatti conducted a study in 2021 in Italy, on 282 children with inflammatory bowel disease (155 with Crohn's disease) aged 8-18 and found that disease activity was one of three negative factors affecting patient's quality of life along with age and gender.[16] Therefore, controlling disease activity is one of the main goals in the management of patients with inflammatory bowel disease. This does not only helps to alleviate symptoms and achieve mucosal healing but also improves psychological and social aspects and ultimately improves HRQoL for patients.

We also evaluated the impact of treatment methods on the quality of life of children. Treatment for Crohn's disease is multimodal, combining optimization of pharmacotherapy with nutritional intervention and surgery when necessary. In this study, we found that children who required surgical intervention had decreased quality of life in terms of physical functioning, school functioning and total HRQoL score compared to non-surgical children, with $p < 0.05$ (**Table 5**). This result is similar to the conclusion of Larissa Caetano Silva (2020), as these authors also found a negative linear correlation between surgical intervention and quality of life of children with inflammatory bowel disease with an estimated beta regression coefficient of -28.612 (p=0.043).[13] Pharmacotherapy remains the cornerstone of Crohn's disease treatment, and there are currently many types of drugs in use alongside those that continue to be studied, particularly the role of biological drugs. However, in this study, we did not find a correlation between the number of drugs patients used for treatment or the use of biological drugs and patients' quality of life (**Table 5**). These were also reported by Matthew Smyth,[6] who also found no correlation between quality of life and the use or non-use of biologic drugs, immunomodulators, or corticosteroids. These findings are similar to those reported by author Anne Gourdonneau et al.[10]

The strength of our study is the first study in Vietnam using a standardized scale for Vietnamese people to assess the HRQoL of Crohn children. A weakness of the study was the small sample size since Crohn's disease is an uncommon disease in Vietnamese children. Besides, we preferred to use information collected from the self-report version when evaluating factors related to decreased quality of life in patients, so this assessment did not include 6 children in the age group 2 - 4 years old (parent-proxy report version only). Besides, due to the cross-sectional nature and no control group, we can not ascertain the causal relationship between HRQoL and the significant factors found in this study.

V. CONCLUSION

Our study confirms that children with Crohn's disease experience a reduced health-related quality of life, especially in school functioning. Additionally, we also identified several factors related to decreased quality of life in patients, which include being female, stunting, living in low-income families, higher disease activity level, and undergoing surgical intervention. Therefore, greater attention should be paid to children with Crohn's disease who have these factors, especially in terms of their school functioning.

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