INTERNATIONAL JOURNAL OF MEDICAL SCIENCE AND DENTAL HEALTH
(ISSN: 2454-4191)
www.ijmsdh.org (2026)

Check for updates

Received: 30 Sep 2026
Revised: 12 Oct 2026
Accepted: 20 Oct 2026
Published: 31 Oct 2026

2026: OCTOBER - IJMSDH
Page No – 141-148
DOI - 10.55640/ijmsdh-spc-21

Article Citation: Gafarova Feruza Muratkhodjaevna, Abdujabarova Zulfiya Muratkhodjaevna, Melieva Zukhra Uktamovna, Isxakova Gulchehra Anvarovna, & Alimuxammedova Dilorom Xamidovna. (2026). Intestinal Malabsorption Syndrome in Children: Clinical and Coprological Characteristics of Digestion and Absorption Processes. International Journal of Medical Science and Dental Health, 1(01), 141-148. https://doi.org/10.55640/ijmsdh-spc-21

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Intestinal Malabsorption Syndrome in Children: Clinical and Coprological Characteristics of Digestion and Absorption Processes

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Abstract

Relevance. Intestinal malabsorption syndrome (IMS) in infants and preschool children is a multifactorial pathological condition characterized by considerable variability of clinical manifestations and a high frequency of associated functional disorders of the gastrointestinal tract (GIT). These features substantially complicate early diagnosis and identification of the main pathogenetic mechanism of the disease, which requires a comprehensive approach to the study of this pathology.

Aim of the study. The aim of this study is a detailed characterization of the clinical and coprological features of digestion and absorption in children with intestinal malabsorption syndrome in different age groups and clinical forms. This will allow a more accurate determination of the pathogenetic

mechanisms and the development of effective methods for the diagnosis and treatment of this condition.

Materials and methods. The study was conducted as part of a single-center clinical and laboratory project involving 53 children aged 1 to 7 years with intestinal malabsorption syndrome. The sample included 16 children in the 1–3 year age group, 26 in the 3–5 year age group and 11 children in the 5–7 year age group. The control group consisted of 66 healthy children of the same age range.

All study participants underwent detailed history taking, a comprehensive clinical examination and laboratory tests, including complete blood count and urinalysis. The coprological examination was performed to assess the presence of steatorrhea, amylorrhea and creatorrhea, as well as to quantify fecal carbohydrate content and the level of fecal pancreatic elastase-1. These methods make it possible to objectively assess the functional state of the digestive system and to identify characteristic signs of intestinal malabsorption syndrome.

Results. The study established that chronic constipation was observed in 25 (47.2%) children with IMS, functional dyspepsia in 5 (9.4%) children, functional disorders of the biliary tract in 16 (30.2%) children, and irritable bowel syndrome in 7 (13.2%) children.

A decrease in fecal pancreatic elastase-1 was detected in 16 (30.2%) children with IMS, of whom 11 (20.8%) had a partial decrease and 5 (9.4%) a marked decrease. Increased fecal carbohydrate content was recorded in 36 (67.9%) children, which indicates impaired carbohydrate metabolism.

Signs of impaired digestion in the coprogram were found with high frequency: creatorrhea was detected in 46 (86.8%) children, amylorrhea in 44 (83.0%) and steatorrhea in 30 (56.6%). These data indicate impaired digestion and absorption of food components.

Among the clinical manifestations of the syndrome, the most frequent were flatulence (33 children, 62.3%), abdominal pain (32 children, 60.4%) and decreased appetite (29 children, 54.7%). Anemia was found in 32 (60.4%) children, residual signs of rickets in 30 (56.6%) and helminthiasis in 11 (20.8%) children, which emphasizes the complex nature of the pathological changes in IMS.

Conclusion. Intestinal malabsorption syndrome (IMS) in children aged 1 to 7 years manifests through clinical symptoms and a variety of coprological markers indicating disorders of digestive and absorptive processes. The high frequency of creatorrhea and amylorrhea, combined with the relatively low frequency of decreased fecal pancreatic elastase-1, indicates the multifactorial nature of these disorders, which go beyond isolated exocrine pancreatic insufficiency. These data confirm the need for a comprehensive clinical and coprological examination of children with IMS, taking into account their age profile and concomitant functional disorders of the gastrointestinal tract.

Keywords: Children, intestinal malabsorption syndrome, malabsorption, maldigestion, coprological examination, pancreatic elastase-1, fecal carbohydrate component, steatorrhea, amylorrhea, creatorrhea.

1. Introduction

Intestinal malabsorption syndrome (IMS) in infants and preschool children is a significant problem in pediatrics and gastroenterology, owing to the multiplicity of etiological factors, the polymorphism of clinical manifestations and the high likelihood of concomitant pathology [1,2]. The pathophysiological mechanism of this syndrome includes disorders of luminal, parietal and membrane digestion, as well as defects in the absorption of nutrients through the apical membrane of enterocytes [3].

In clinical practice, IMS is often accompanied by dysfunction of intestinal motility, functional dyspepsia syndrome, disorders of the biliary tract and abdominal pain syndrome. These concomitant symptoms substantially complicate differential diagnosis and require a multidisciplinary approach to examination, including a comprehensive clinical and laboratory investigation [4,5].

Non-invasive methods that allow the functional state of the digestive system to be assessed are of particular importance in the diagnosis of IMS. Determination of fecal elastase-1 serves as an indicator of exocrine pancreatic function and is a valuable tool in pediatric practice owing to its non-invasiveness [6,7]. It is important to note that a decrease in fecal elastase does not always indicate impaired digestion of food and should be interpreted in light of the clinical picture and the results of additional investigations.

Analysis of fecal carbohydrate content is an additional diagnostic method used when carbohydrate metabolism disorders are suspected. An increase in fecal carbohydrates may be observed in various pathological conditions, including accelerated chyme transit and disaccharidase deficiency, which limits its specificity as a marker of disaccharidase deficiency [8].

The classical coprological examination, which includes assessment of steatorrhea, amylorrhea and creatorrhea, provides important information on the nature of digestive processes. However, these coprological signs do not always have high specificity and should be interpreted taking into account the child's age characteristics, the nature of feeding, the state of

intestinal motor function and other clinical and laboratory data [3,9].

Thus, an integrative assessment of clinical manifestations and coprological markers allows a more accurate characterization of the pathogenetic mechanisms of digestion and absorption disorders in children with IMS, which contributes to the development of individualized approaches to the treatment and prevention of this syndrome.

Aim of the study — to characterize the clinical and coprological features of digestion and absorption processes in children with IMS of different age groups and clinical phenotypes.

2. Objectives of The Study

1. To conduct a comprehensive analysis of the age and clinical structure of intestinal malabsorption syndrome (IMS) in a pediatric population that underwent a comprehensive examination.

2. To establish the statistical frequency of decreased fecal pancreatic elastase-1, which is an important biomarker of exocrine pancreatic insufficiency.

3. To determine the prevalence of increased fecal carbohydrate levels, which may indicate impaired carbohydrate metabolism and intestinal epithelial dysfunction.

4. To describe in detail the frequency of the main coprological symptoms, such as steatorrhea (excessive fecal fat excretion), amylorrhea (increased content of undigested starch) and creatorrhea (excessive excretion of muscle fibers), which are indicators of different types of digestive disorders.

5. To assess the prevalence of the main clinical manifestations and concomitant conditions in children with IMS.

3. Materials and Methods

In this single-center study, a comprehensive program comprising clinical and laboratory stages was implemented to study intestinal malabsorption syndrome (IMS) in children. The main study group consisted of 53 patients aged 1 to 7 years diagnosed with IMS. Age stratification identified three subgroups: the first included 16 children aged 1 to 3 years (30.2%); the second, 26 children aged 3 to 5 years (49.1%); the third, 11 children aged 5 to 7 years (20.8%). The gender composition of the group was as follows: 28 girls (52.8%) and 25 boys (47.2%). Sixty-six healthy children of the same age range were selected as the control group; the control group included practically healthy children of the corresponding age range and was used to compare selected clinical and laboratory parameters.

For a more detailed analysis of the main group, the patients were additionally divided into four subgroups according to concomitant clinical syndromes: IMS with chronic constipation, functional dyspepsia, functional disorders of the biliary tract and irritable bowel syndrome, which allowed a more differentiated analysis of the pathogenetic mechanisms and clinical manifestations of the disease.

The comprehensive examination included history taking, assessment of complaints, physical examination, and laboratory tests such as a complete blood count with determination of hemoglobin, white blood cell differential and erythrocyte sedimentation rate (ESR), urinalysis and coprological examination. The coprological examination was aimed at assessing stool frequency, consistency and color, as well as identifying signs of steatorrhea, amylorrhea and creatorrhea, which is an important indicator of the functional state of the digestive system. Steatorrhea was assessed by the presence of neutral fat, fatty acids and soaps; amylorrhea by the content of undigested starch; and creatorrhea by the presence of undigested muscle fibers. In addition, fecal carbohydrate content and the level of fecal pancreatic elastase-1 were determined by enzyme-linked immunosorbent assay, which made it possible to assess exocrine pancreatic function.

Statistical data processing included the calculation of absolute and relative values. Pearson's χ^2 test was used to compare qualitative characteristics, which made it possible to identify statistically significant differences at a significance level of $p<0.05$, indicating a high level of reliability of the results obtained.

Table 1.

General characteristics of the examined children

Indicator	Main group, n=53		Control group, n=66		P
	abs.	%	abs.	%	
Age 1–3 years	16	30.2	15	22.7	<0,05
Age 3–5 years	26	49.1	32	48.5	<0,05
Age 5–7 years	11	20.8	19	28.8	<0,05
Girls	28	52.8	35	53.0	<0,05

Boys	25	47.2	31	47.0	<0,05

4. Results. Clinical structure of IMS.

In the study group, IMS was most often combined with chronic constipation — in 25 of 53 children (47.2%). Functional disorders of the biliary tract were found in 16 (30.2%) children, irritable bowel syndrome in 7 (13.2%) and functional dyspepsia in 5 (9.4%).

The age structure of the clinical variants is presented in Table 2.

Table 2.

Distribution of clinical forms of IMS by age group

Age group	IMS with CC	IMS with FD	IMS with FBTD	IMS with IBS	Total
1–3 years (n=16)	11 (68.8%)	0 (0%)	3 (18.8%)	2 (12.5%)	16
3–5 years (n=26)	11 (42.3%)	3 (11.5%)	10 (38.5%)	2 (7.7%)	26
5–7 years (n=11)	3 (27.3%)	2 (18.2%)	3 (27.3%)	3 (27.3%)	11
Total (n=53)	25 (47.2%)	5 (9.4%)	16 (30.2%)	7 (13.2%)	53

The analysis of the relationship between age and the clinical form of intestinal malabsorption syndrome (IMS) yielded the following results:

$\chi^2 = 8.72$; df = 6; P = 0.190; Cramér's V = 0.287.

No statistically significant association between age and the clinical form of IMS was found ($p > 0.05$). However, certain clinical trends were identified:

1. In the 1–3 year age group, the form of IMS combined with chronic constipation (CC) predominated — in 11 children (68.8%). Functional dyspepsia (FD) and functional disorders of the biliary tract (FBTD) were not diagnosed. The combination of IMS with irritable bowel syndrome (IBS) was found in 2 children (12.5%).

2. In the 3–5 year age group, the form of IMS with CC also predominated — in 11 children (42.3%). However, the proportion of children with FBTD increased — to 10 cases (38.5%). FD was diagnosed in 3 children (11.5%) and IBS in 2 (7.7%).

3. In the 5–7 year age group, the distribution of clinical forms became more even:

IMS with CC — in 3 children (27.3%);

FD — in 2 (18.2%);

FBTD — in 3 (27.3%);

IBS — in 3 (27.3%).

With age, there is a trend towards a decrease in the proportion of IMS with CC and an increase in the diversity of clinical variants.

Exocrine pancreatic dysfunction and carbohydrate metabolism parameters in children

The results presented in Table 3 reveal signs of exocrine pancreatic insufficiency and impaired carbohydrate digestion in all age categories of study participants.

Analysis of fecal pancreatic elastase-1 showed that a partial decrease in its level was observed in 11 children (20.8%) and a marked decrease in 5 participants (9.4%). The highest frequency of a partial decrease in elastase-1 was recorded in the 5–7 year age group (3 cases, 27.3%). This was followed by children aged 1–3 years (4 cases, 25.0%) and 3–5 years (4 cases, 15.4%). A marked decrease in elastase-1 was more common in children aged 1–3 years — 2 cases (12.5%), whereas in the 5–7 and 3–5 year age groups this figure was 1 case (9.1%) and 2 cases (7.7%), respectively.

The study also revealed an increase in fecal carbohydrate levels in all age categories. A moderate increase in carbohydrate content was observed in 22 children (41.5%) and a marked increase in 14 participants (26.4%). The highest frequency of a moderate increase in carbohydrate levels was recorded in the 5–7 year group — 5 cases (45.5%). This was followed by children aged 1–3 years (7 cases, 43.8%) and 3–5 years (10 cases, 38.5%). A marked increase in fecal carbohydrate levels was noted with similar frequency in children aged 3–5 and 5–7 years — 7 cases (26.9%) and 3 cases (27.3%), respectively, whereas in children aged 1–3 years this figure was 4 cases (25.0%).

Thus, the most common abnormality among the study participants was increased fecal carbohydrate levels, which was found in 41.5% of children to a moderate degree and in 26.4% to a marked degree. Abnormalities of fecal pancreatic elastase-1 were less frequent: a partial decrease was diagnosed in 20.8% of children and a marked decrease in 9.4%. These data indicate a predominance of signs of impaired carbohydrate metabolism over symptoms of marked exocrine pancreatic insufficiency in the studied population.

Table 3.

Frequency of decreased fecal pancreatic elastase-1 and increased fecal carbohydrate content by age group

Age	Elastase: partial decrease	Elastase: marked decrease	Carbohydrates: moderate increase	Carbohydrates: marked increase
1–3 years (n=16)	4 (25.0%)	2 (12.5%)	7 (43.8%)	4 (25.0%)
3–5 years (n=26)	4 (15.4%)	2 (7.7%)	10 (38.5%)	7 (26.9%)
5–7 years (n=11)	3 (27.3%)	1 (9.1%)	5 (45.5%)	3 (27.3%)
Total (n=53)	11 (20.8%)	5 (9.4%)	22 (41.5%)	14 (26.4%)

Coprological signs of digestive disorders

Coprological signs of impaired digestion of nutrients were detected with high frequency. Creatorrhea was recorded in 46 (86.8%) children, amylorrhea in 44 (83.0%) and steatorrhea in 30 (56.6%).

Thus, the most frequent changes were creatorrhea and amylorrhea. Moreover, the frequency of these signs significantly exceeded the frequency of decreased fecal pancreatic elastase-1.

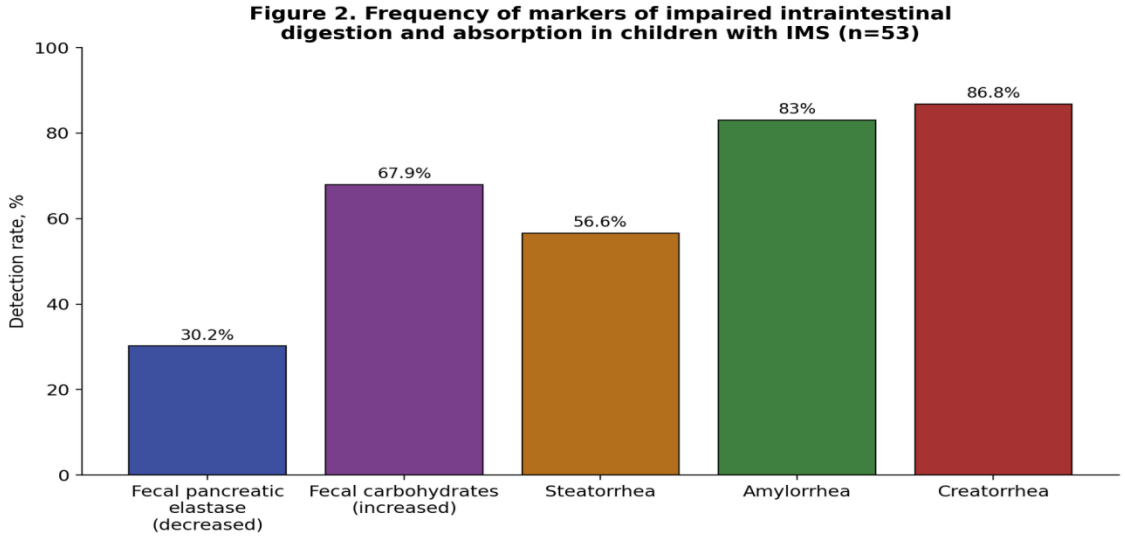


Fig. 1. Frequency of markers of impaired intraintestinal digestion and absorption in children with IMS

As shown in Figure 1, the frequency of creatorrhea and amylorrhea markedly exceeded the frequency of both steatorrhea and objectively decreased pancreatic elastase-1, which indicates a predominantly functional, rather than exclusively enzymatic-pancreatic, nature of the digestive disorder in a significant proportion of the examined children.

A comparative analysis of the above indicators allows the hypothesis that in a significant number of children, disorders of the digestive tract cannot be explained solely by a decrease in exocrine pancreatic activity. Evidently, the specific features of changes in fecal masses may be influenced by factors such as diet, intestinal motility, the functional state of the biliary tract and

others. Additional studies are required to establish the specific pathogenetic mechanism.

Stool characteristics

Abnormal defecation frequency was found in most of the examined children. Bowel movements once every 2–3 days were noted in 27 (50.9%) children, every other day in 16 (30.2%), 2–3 times a day in 5 (9.4%), and once daily also in 5 (9.4%).

By consistency, mushy or semi-formed stool was recorded most often — in 25 (47.2%) children; mushy unformed stool in 18 (34.0%); and fragmented, "sheep-dropping" type stool in 10 (18.9%).

By color, brown stool predominated — in 21 (39.6%) children, followed by dark yellow in 12 (22.6%), yellow in 11 (20.8%) and dark brown in 9 (17.0%).

Clinical manifestations and concomitant conditions

The most frequent complaints and clinical manifestations were flatulence — in 33 (62.3%) children, abdominal pain syndrome — in 32 (60.4%), decreased appetite — in 29 (54.7%) and constipation — in 26 (49.1%).

Skin changes in the form of pallor and increased moisture were noted in 36 (67.9%) children, dry skin in 16 (30.2%) and diarrhea in 5 (9.4%).

Anemia was found in 32 (60.4%) children, residual signs of rickets in 30 (56.6%), helminthiasis in 11 (20.8%) and asthenoneurotic syndrome in 23 (43.4%).

Table 4.

Frequency of clinical manifestations and concomitant conditions in children with IMS

Indicator	n	%
Abdominal pain syndrome	32	60.4
Decreased appetite	29	54.7
Constipation	26	49.1
Skin moisture/pallor	36	67.9
Dry skin	16	30.2
Diarrhea	5	9.4
Anemia	32	60.4
Rickets (residual signs)	30	56.6
Helminthiasis	11	20.8
Asthenoneurotic syndrome	23	43.4

5. Discussion

This study revealed considerable clinical and laboratory heterogeneity of intestinal malabsorption syndrome (IMS) in children aged 1 to 7 years. The clinical picture was dominated by the combination of IMS with chronic constipation, recorded in 47.2% of cases. This form of the disease was especially common among younger children, whereas in older patients there was an increase in the proportion of combinations of IMS with biliary tract dysfunction and irritable bowel syndrome (IBS).

The age dynamics of clinical manifestations may indicate a change in the nature of functional disorders of the gastrointestinal tract (GIT) as the child grows [4,5]. However, given the limited number of participants in individual age subgroups, the results require cautious interpretation and confirmation in larger studies.

One of the key findings of the study is the high frequency of coprological markers of digestive disorder. Creatorrhea was detected in 86.8% of children, amylorrhea in 83% and steatorrhea in 56.6%. A decrease in fecal pancreatic elastase-1 was recorded in only 30.2% of patients.

This discrepancy emphasizes that the presence of creatorrhea, amylorrhea and/or steatorrhea is not sufficient grounds for diagnosing exocrine pancreatic insufficiency. Coprological parameters reflect the end result of a complex digestive process and may be influenced by factors such as diet, intestinal transit rate, intestinal motility and biliary tract function [6,7]. Therefore, coprological data should be interpreted in light of the fecal elastase-1 level and the clinical picture [7].

Increased fecal carbohydrate content was found in 67.9% of children, which indicates a high frequency of impaired

carbohydrate digestion or absorption in the studied group [8]. However, this indicator is nonspecific and does not by itself allow the localization and etiology of the disorders to be determined; it should therefore be regarded as an additional marker within a comprehensive examination.

The high frequency of flatulence, abdominal pain and decreased appetite corresponds to the identified structure of functional GIT disorders. The predominance of constipation also correlates with the dominant clinical form of IMS in this age group.

The high frequency of anemia (60.4%) and residual signs of rickets (56.6%) deserves particular attention. These data indicate a considerable prevalence of conditions associated with nutritional deficiency, impaired intake or absorption of micronutrients and age-related features of early childhood. However, on the basis of this study it cannot be stated that anemia and rickets are directly caused by IMS, since establishing a causal relationship requires assessment of iron metabolism, vitamin D, calcium, phosphorus and other essential nutrients.

The results of this study confirm the need for a comprehensive approach to the assessment of children with IMS, including clinical examination, coprological analysis, determination of fecal pancreatic elastase-1, analysis of fecal carbohydrate content and identification of deficiency states.

Limitations of the study

This study has a number of methodological limitations that must be taken into account when interpreting the results. First of all, it was conducted at a single medical center, which limits its representativeness and generalizability to a wider population. The sample used in the study was also relatively small, which may reduce statistical power and the accuracy of conclusions.

In addition, the study did not include a morphological assessment of the small intestinal mucosa, which could have provided additional data on the structural changes accompanying malabsorption. The limited range of laboratory markers used to diagnose malabsorption should also be considered when analyzing the results.

The study is predominantly descriptive, which limits the possibility of establishing causal relationships between different clinical phenotypes, changes in the coprogram and age. A deeper analysis of these relationships requires additional statistical methods, such as assessment of the significance of differences between groups and, if necessary, correlation analysis. This would make it possible to determine more accurately the influence of age-related factors on clinical manifestations and the pathophysiological mechanisms of malabsorption.

The results of coprological examination, as is known, can be substantially affected by factors such as dietary characteristics, intestinal transit rate and the patient's preparation for the examination. They should therefore be interpreted in light of clinical and laboratory data in order to ensure a fuller and more objective understanding of the pathogenesis of malabsorption.

6. Conclusion

Intestinal malabsorption syndrome (IMS) in children aged 1 to 7 years is characterized by marked clinical heterogeneity and is often associated with functional disorders of the gastrointestinal tract. One of the most common clinical manifestations is the combination of IMS with chronic constipation, observed in 47.2% of the examined children.

Coprological changes indicating digestive dysfunction are detected with high frequency: creatorrhea is noted in 86.8% of children, amylorrhea in 83.0% and steatorrhea in 56.6%. At the same time, a decrease in fecal pancreatic elastase-1 is recorded in 30.2% of those examined, and an increase in fecal carbohydrate content in 67.9%.

The high prevalence of coprological changes with a relatively low frequency of decreased fecal pancreatic elastase-1 indicates the multifactorial nature of digestive disorders in this category of children. This allows the conclusion that the pathogenesis of IMS cannot be explained solely by exocrine pancreatic insufficiency.

The high prevalence of anemia and residual signs of rickets underscores the importance of assessing nutritional status and identifying deficiency states in children with IMS.

A comprehensive clinical and coprological examination, including determination of fecal pancreatic elastase-1 and fecal carbohydrate content, is an additional tool for assessing digestion and absorption disorders and for developing a further diagnostic strategy.

References

1. Belmer S.V., Khavkin A.I. Functional gastrointestinal disorders in young children: diagnosis and treatment tactics. Voprosy sovremennoi pediatrii (Current Pediatrics). 2018;17(6):442–450. (In Russ.)
2. Mukhina Yu.G., Chubarova A.I., Geraskina V.P. Malabsorption syndrome in young children: current concepts. Pediatriya (Pediatrics). 2015;94(3):112–118. (In Russ.)
3. Vandenplas Y., Gutierrez-Castrellon P., Velasco-Benitez C. et al. Practical algorithms for managing common gastrointestinal symptoms in infants. Nutrition. 2013;29(1):184–194.

4. Hyams J.S., Di Lorenzo C., Saps M. et al. Functional disorders: children and adolescents. Rome IV Criteria. Gastroenterology. 2016;150(6):1456–1468.
5. Benninga M.A., Faure C., Hyman P.E. et al. Childhood functional gastrointestinal disorders: neonate/toddler. Rome IV Criteria. Gastroenterology. 2016;150(6):1443–1455.
6. Löser C., Möllgaard A., Fölsch U.R. Faecal elastase 1: a novel, highly sensitive, and specific tubeless pancreatic function test. Gut. 1996;39(4):580–586.
7. Walkowiak J., Nousia-Arvanitakis S., Henker J. et al. Indirect pancreatic function tests in children. Journal of Pediatric Gastroenterology and Nutrition. 2005;40(2):107–114.
8. Heitlinger L.A., Lebenthal E. Disorders of carbohydrate digestion and absorption. Pediatric Clinics of North America. 1988;35(1):239–255.
9. Guarino A., Lo Vecchio A., Berni Canani R. Chronic diarrhoea in children. Best Practice & Research Clinical Gastroenterology. 2012;26(5):649–661.
10. World Health Organization. Complementary feeding: report of the global consultation. Geneva: WHO, 2003.
11. Farthing M.J.G. Diarrhoea: a significant worldwide problem. International Journal of Antimicrobial Agents. 2000;14(1):65–69.
12. Zakharova I.N., Dmitrieva Yu.A. Malabsorption syndrome in children: diagnostic algorithm. Meditsinskii sovet (Medical Council). 2017;(1):122–128. (In Russ.)
13. Bhutta Z.A., Berkley J.A., Bandsma R.H.J. et al. Severe childhood malnutrition. Nature Reviews Disease Primers. 2017;3:17067.
14. Fine K.D., Ogunji F. A new method of quantitative fecal fat microscopy and its correlation with chemically measured fecal fat output. American Journal of Clinical Pathology. 2000;113(4):528–534.
15. Kornienko E.A. Pediatric Gastroenterology. Saint Petersburg: SpetsLit, 2020. (In Russ.)