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Systematic Review

Management of children with irritable bowel syndrome in general practice – a systematic review

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ABSTRACT

INTRODUCTION. Irritable bowel syndrome (IBS) is the most frequently reported paediatric functional abdominal pain disorder (FAPD). It impacts quality of life, contributes to school absenteeism and can result in chronic pain. This review investigated the management of children with IBS in general practice regarding diagnostic evaluation, use of the Rome Criteria, diagnostic outcomes, referrals, prescriptions and follow-ups.

METHODS. A systematic review was conducted following the PRISMA guidelines. Studies were identified through a structured PubMed search and screened using predefined inclusion criteria. Eligible studies focused on general practitioners' management of children with episodic abdominal pain, in which IBS could be a subtype. Data were reported narratively due to heterogeneity across studies.

RESULTS. Five observational studies involving over 4,300 children were included. The proportion of children receiving a functional diagnosis ranged from 16% to 84%, and the Rome Criteria were rarely used (7-27% of cases). Blood and urine tests were commonly used. Prescriptions and referrals differed across studies. Follow-up was rare.

CONCLUSIONS. IBS is the most common FAPD in children. Though often managed by general practitioners, it remains unclear how they diagnose and treat these cases. The Rome Criteria appear to be rarely used, and diagnosis frequency varies, suggesting some children may be overlooked or misclassified. Follow-up is infrequent, and it is unclear whether a biopsychosocial approach is used. More research is needed to understand and improve care in this setting.

KEY POINTS

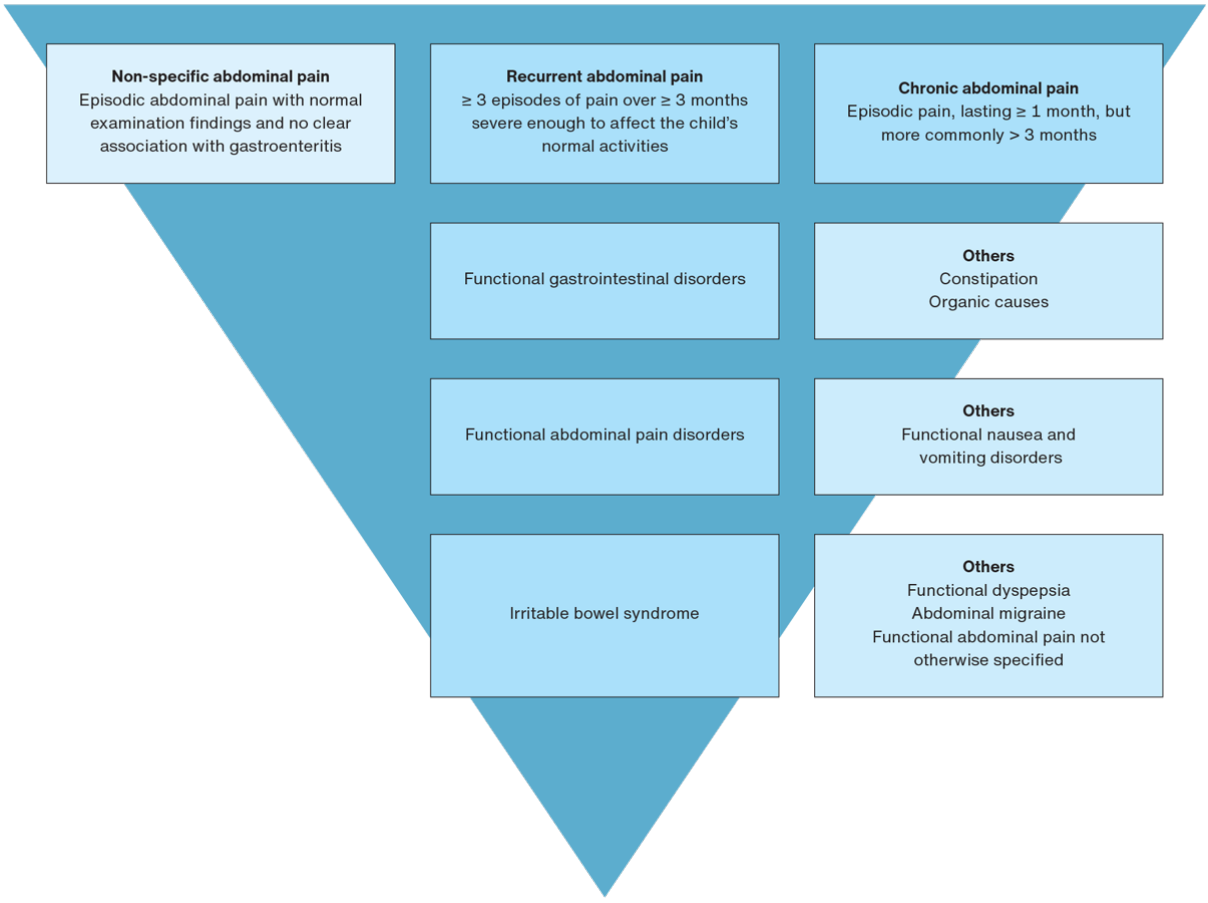
- Most children with Iirritable bowel syndrome are managed in general practice, but few studies examine how they are diagnosed and treated.
- Despite presenting with similar symptoms, the proportion of children receiving a functional diagnosis varies widely.
- The Rome Criteria are rarely used, and many general practitioners report limited knowledge of them.

Irritable bowel syndrome (IBS) is the most prevalent functional abdominal pain disorder (FAPD) in children, with a global pooled prevalence of 8.8%. FAPDs are associated with anxiety, depression and stress, and they often contribute to school absenteeism and chronic pain [1]. Children with IBS have a lower health-related quality of life than children with other chronic gastrointestinal symptoms, highlighting the need to differentiate

IBS from other FAPD subtypes [2].

IBS is characterised by episodic abdominal pain associated with defecation or changes in stool frequency or form [3]. Episodic abdominal pain in children is a common reason for primary care consultations, yet an organic cause is identified in only 5-10% of cases, with the remaining cases being classified as functional gastrointestinal disorders (FGIDs) [4]. Terminology for episodic abdominal pain in children is inconsistent, with terms such as recurrent, chronic and non-specific abdominal pain often being used interchangeably, complicating the distinction between conditions and comparability across studies [5]. See **Figure 1** for a hierarchy of terms.

FIGURE 1 Hierarchy of terms in episodic abdominal pain [3, 5].



IBS is diagnosed based on symptomatology using the Rome Criteria (**Table 1**) [3, 6]. Introduced in 1990 and updated several times, Rome II (1999) was the first to include paediatric guidelines [7], and Rome IV (2016) shifted focus from excluding somatic disease to enabling a positive clinical diagnosis [3]. However, it is not well established whether primary care clinicians are aware of or apply the Rome Criteria, which represents an important knowledge gap [8]. Consequently, the diagnostic approaches clinicians use to identify IBS are not yet well understood. This review addresses this knowledge gap by exploring the extent to which these guidelines are known and implemented in practice.

TABLE 1 Paediatric Rome Criteria for irritable bowel syndrome: children aged 4-18 years [3, 7].

	Rome III, 2006	Rome IV, 2016
Definition	Abdominal pain-related functional gastrointestinal disorders	Functional abdominal pain disorders
Subtypes	Functional dyspepsia	Functional dyspepsia
	IBS	IBS
	Abdominal migraine	Abdominal migraine
	Childhood functional abdominal pain: childhood functional abdominal pain syndrome	Functional abdominal pain not otherwise specified
Premises	The following diagnosis requires that there be no evidence of an inflammatory, anatomic, metabolic or neoplastic process that explains the patient's symptoms	After appropriate medical evaluation, the symptoms cannot be attributed to another medical condition
Diagnostic criteria for IBS	*Must include all of the following fulfilled at least once per week for at least 2 months*	*Must be fulfilled for at least 2 months before diagnosis and must include all of the following*
	Abdominal discomfort or pain associated with at least 2 of the following at least 25% of the time:	Abdominal pain at least 4 days per month associated with at least 1 of the following:
	Improved with defaecation	Related to defaecation
	Onset associated with a change in frequency of stool	A change in frequency of stool
	Onset associated with a change in form of stool	A change in form (appearance) of stool
		In children with constipation, the pain does not resolve with resolution of the constipation: children in whom the pain resolves have functional constipation, not IBS
Subtypes equal to adults introduced	-	IBS-C, IBS-D, IBS-M, IBS-U

IBS = irritable bowel syndrome; IBS-C = IBS with constipation; IBS-D = IBS with diarrhoea; IBS-M = IBS with mixed bowel habits; IBS-U = IBS unclassified.

IBS treatment guidelines centre around establishing a definitive diagnosis and ruling out organic disease. Symptomatic medication may be used, but the key elements are a positive symptom-based diagnosis, identification of psychosocial problems and reassurance of the patient [8, 9]. Despite the high prevalence and clinical burden of paediatric IBS, the management of this condition in general practice remains poorly described. Existing reviews have focused broadly on FGIDs or recurrent abdominal pain, without examining IBS specifically.

The present systematic review, therefore, aims to investigate how children with IBS are diagnosed and managed in general practice and to what extent these practices align with guideline recommendations. By synthesising available evidence, it addresses a key knowledge gap and provides insights to improve diagnostic accuracy, reduce unnecessary testing and ensure optimal treatment.

Methods

This systematic review adheres to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines [10].

Search strategy and information sources

The search strategy was based on the Population-Exposure-Outcome (PEO) framework, targeting "Irritable Bowel Syndrome", "Child" and "General Practice". Both MeSH terms and free-text terms were used. The search was conducted in PubMed on 19 September 2024 and was limited to studies published from 2004 to 2024.

Eligibility criteria

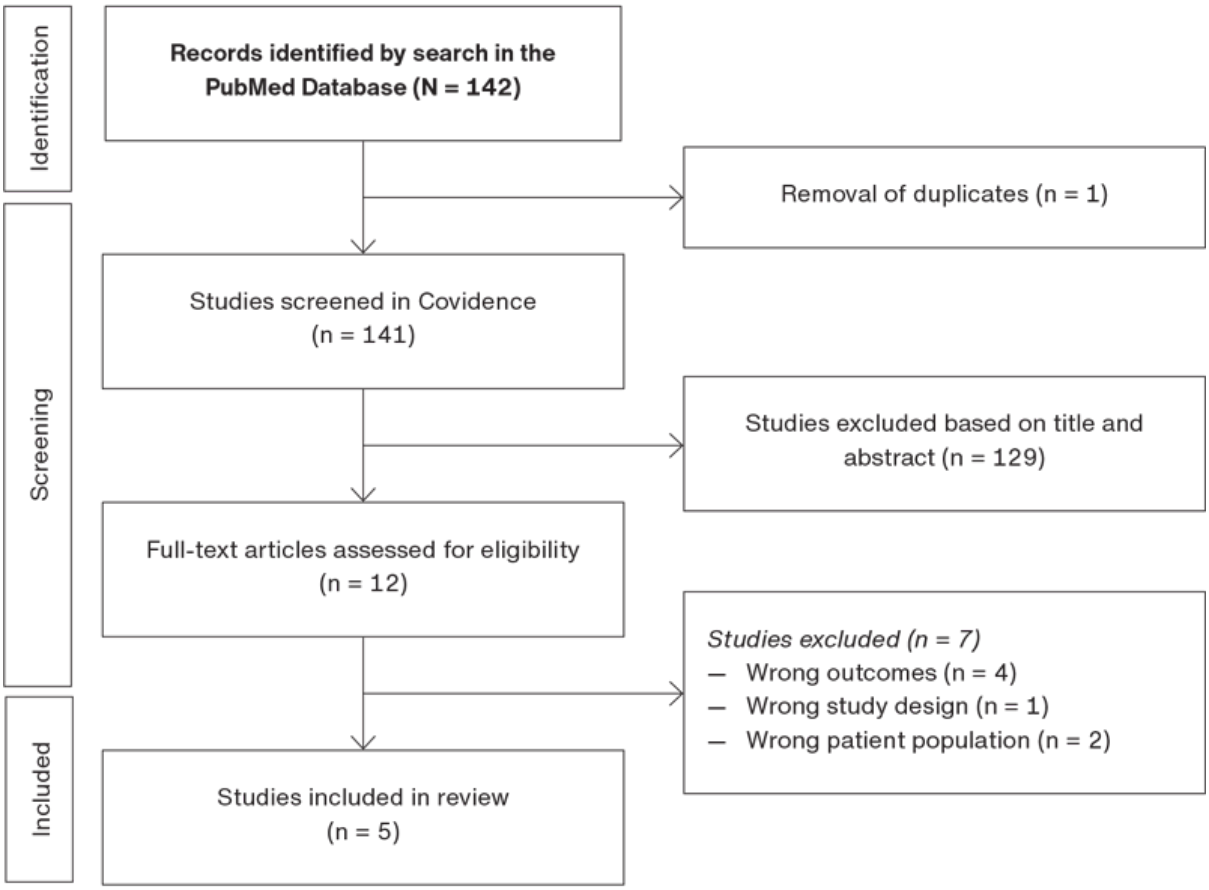
Eligible studies were original, peer-reviewed, published in English or a Scandinavian language and focused on the management in general practice of children experiencing episodic abdominal pain, defined in this review as recurrent, chronic or non-specific abdominal pain. Studies had to be conducted in countries with healthcare systems similar to Denmark's, where primary care is accessible to all without referral and is either free of charge

or covered by insurance for the majority of the population.

Selection process, bias and quality assessment

All titles and abstracts were screened independently by two reviewers using Covidence [11]. Full-text studies were assessed for eligibility by the first author using the inclusion and exclusion criteria, and disagreements were resolved through discussion with the second author (**Figure 2**). To ensure quality, all included studies were assessed using the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist for observational studies [12].

FIGURE 2 Study selection flow chart.



Synthesis process

Data were extracted on study design, setting, participant characteristics and data sources. Reported results were then organised into four predefined categories reflecting the focus of the review: diagnostic evaluation, diagnostic outcomes, use of Rome Criteria and management in general practice. Not all included studies reported information across all outcome categories. In such cases, only the available information was extracted and reported. Within each category, recurring patterns were identified and compared across studies. Relationships between findings were further explored in light of the study context and the quality of each study, which informed the interpretation of robustness addressed in the discussion. Due to heterogeneity in study design and methods, outcomes were reported narratively, following the framework for narrative synthesis proposed by Popay et al., to ensure transparency and reproducibility [13].

Results

A total of 142 studies were identified. After title and abstract screening, 12 full texts were assessed for eligibility, and five studies were included (Figure 2). All studies were assessed by the first author using the STROBE checklist, with a mean quality score of 20 out of 22.

Study characteristics

Table 2 presents the characteristics of the five included observational studies: three retrospective cohort studies [14-16] and two cross-sectional studies [17, 18]. All studies originated in the Netherlands or the United States, whose healthcare systems are broadly comparable to Denmark's, though there are structural differences. Primary care in the Netherlands is organised with the general practitioner being the gatekeeper to secondary care. In the US, primary care physicians can be specialists in family medicine, general internal medicine or general paediatrics. Access to healthcare varies depending on your insurance, but in most cases, primary care providers will be the first to evaluate the child [19, 20].

TABLE 2 Study characteristics.

Reference	Study aims	Study design	Data collection methods	Participants
Gieteling et al., 2011, Netherlands [15]	To estimate the occurrence of childhood NSAP To study associated factors To determinate family physicians' management	Retrospective cohort study	Registration data from the Second Dutch National Survey of General Practice	1,480 children Age: 4-17 yrs
Wallis & Fiks, 2015, United States [16]	To describe characteristics of children with nonspecific AP in primary care, their evaluation and their outcomes	Retrospective cohort study	Chart review + Automated extraction of data from electronic health records	375 children Age: 4-13 yrs
Ansems et al., 2023, Netherlands [17]	To describe the testing, prescription, referral and follow-up management by GPs for children presenting with non-acute AP and/or diarrhoea in primary care	Retrospective cohort study	Registry data from the Dutch primary care database AHON	2,200 children Age: 4-17 yrs
Spee et al., 2013, Netherlands [18]	To describe the proportion of children presenting with GPFAP To describe diagnostic management by the GP in children presenting with AP To evaluate whether children with GPFAP meet the diagnostic criteria for functional AP as described in current literature	Cross-sectional study	Baseline data from the HONEUR abdominal pain cohort + Data collected at visit from research nurse	305 children Age: 4-17 yrs
Schurman et al., 2014, United States [19]	To evaluate existing conceptualisations of CAP in children, physician awareness and use of the Rome Criteria, and current approaches to clinical practice among primary care paediatricians	Cross-sectional study	Survey completed by participating doctors	470 primary care paediatricians

AP = abdominal pain; CAP = chronic AP; GP = general practitioner; GPFAP = AP diagnosed by the GP as functional AP; NSAP = non-specific AP.

None of the studies focused exclusively on children with IBS; instead, they examined primary care management of children with abdominal pain presentations in which IBS was a possible subtype: non-specific abdominal pain [14, 15], non-acute abdominal pain [16], functional abdominal pain [17] or recurrent/chronic abdominal pain [18]. All the children presented with a new onset, non-acute abdominal pain or were only included if already assigned a diagnosis consistent with non-specific abdominal pain. The duration of symptoms varied, with no specific time frame in some studies [14, 15, 17], symptoms persisting for more than seven days in another [16] or being classified as recurrent or chronic [18].

Four studies used registry data, together including 4,360 children aged 4-17 years [14-17]. The fifth study examined paediatric general practitioners' perspectives on the management and understanding of chronic abdominal pain in children [18]. It is important to consider this distinction when interpreting the results, as the study is based on perceptions of patient management rather than actual clinical practice. Data were synthesised across four categories: diagnostic evaluation, diagnostic outcome, use of Rome Criteria and management in general practice (Supplementary file 1).

Diagnostic evaluation

Diagnostic testing was common in most studies, with blood and urine tests being used most frequently. Wallis & Fiks [15], Spee et al. [17] and Ansems et al. [16] reported that 17%, 23%, and 32.2% of children, respectively, underwent laboratory tests during their initial visit. Radiological examinations were less frequent, with only 8-14% of children undergoing such testing [15]. Testing rarely influenced the diagnosis; only 3% of lab tests led to a

definitive diagnosis [15]. Schurman et al. [18] found that more than 70% of paediatric general practitioners routinely used blood and urine tests, whereas radiology was less common. In Gieteling et al. [14], only 1.1% of children had additional tests performed. However, these children were included based on their final diagnosis, leaving little diagnostic uncertainty and a need for further tests.

Use of the Rome Criteria and diagnostic outcomes

The proportion of children receiving a FGID ranged from 16% to 84% across studies, reflecting substantial variability in diagnostic practices. Ansems et al. [16] found that 83.5% children were diagnosed with a FGID, 17.5% of these with IBS. Similarly, Spee et al. [17] found that 89.2% were diagnosed with functional abdominal pain. While this study incorporates symptoms described by the Rome Criteria, it employs a different time frame, resulting in only 50.6% of patients meeting the official diagnostic criteria for FGID; 38.5% of these are IBS. Wallis & Fiks [15] reported a notably different outcome, with only 30% of the children receiving a diagnosis. Among these, just 16% were diagnosed with functional abdominal pain. Among the 70% who did not receive a diagnosis, 21% met one or more Rome Criteria, suggesting that many cases of FGIDs may be overlooked by general practitioners.

Schurman et al. [18] reported that only 27% of children with chronic abdominal pain were diagnosed as functional. Additionally, 58% of practitioners reported feeling insufficiently knowledgeable about the Rome Criteria, and only 7% used these criteria in their practice. There was no clear consensus among paediatric primary care practitioners regarding the definition of FGID, despite the fact that most children with chronic abdominal pain meet the criteria for FGIDs. Gieteling et al. [14] only included prediagnosed cases, and the use of the Rome Criteria was not reported. How the clinicians arrived at the final diagnosis remains unknown. The higher FGID rate in Ansems et al. [16] may indicate that the Rome Criteria have become more prevalent in primary care since the publication of the earlier studies.

Referrals, prescriptions and follow-up

Gieteling et al. [14], Ansems et al. [16] and Spee et al. [17] reported referral rates to secondary care after the first consultation ranging from 2.5% to 10.1%. In contrast, 54% of practitioners in Schurman et al. [18] reported they would refer based on factors such as family concerns, test results or uncertainty about treatment. Two studies reported medical prescription rates of 21-35%, mainly laxatives [14, 16]. Only Ansems et al. [16] provided clear follow-up data, showing that just 25% had a follow-up consultation within four weeks. 92.7% of children in Gieteling et al. [14] had only one or two visits, indicating that most did not receive any follow-up consultations.

Discussion

This review reveals variation in how general practitioners manage children with episodic abdominal pain, particularly regarding the use of the Rome Criteria, follow-up and the application of functional diagnoses. Blood and urine tests are common before diagnosis, but paraclinical results typically do not change the diagnosis. Functional diagnoses vary widely (16-84%) even when children present with similar symptoms. The Rome Criteria are rarely applied, and many general practitioners reported lacking sufficient knowledge of them. One study found that only 50.6% of diagnoses aligned with the Rome Criteria, indicating uncertainty about how FAPDs are diagnosed in primary care. Prescription practices varied, but laxatives were most common. Referral rates also varied. Data on follow-up consultations are limited, suggesting that these are rarely provided for children

The Rome Criteria as a diagnostic tool

Rome IV (2016) revised the definition of FGIDs to support a positive diagnosis without requiring exclusion of all

organic causes [3]. Only one study was published after the introduction of the Rome IV criteria. This temporal factor may partly explain why more recent studies have reported higher FGID rates and more frequent use of standardised diagnostic frameworks. The diagnostic practices must therefore be interpreted in the context of the earlier guidelines for diagnosing functional disorders.

Ordering tests or referring children with FGIDs may impose unnecessary stress, but diagnosing without prior evaluation can be challenging due to the fear of overlooking organic disease. Hung et al. [21] found that most primary care physicians make a tentative IBS diagnosis from the initial visit but still tend to use additional testing to confirm their initial findings. The Danish Paediatric Society's guidelines [9] address this challenge by identifying certain symptoms as red flags and highlighting signs that suggest a functional disorder, thereby helping clinicians distinguish organic and functional disease. The guidelines also include the Rome Criteria. A study by Hogervorst et al. found that only 10% of children who met the Rome III criteria for an IBS diagnosis were diagnosed with IBS by their general practitioner [2]. Most of the children were instead diagnosed with constipation. Similarly, Hungin et al. [21] showed that few general practitioners used formal diagnostic criteria, though many felt able to recognise key IBS symptoms. How diagnoses are ultimately made remains unclear.

Comparing with adults

The global prevalence of IBS in adults is 9.2% (Rome III) and 3.8% (Rome IV) [22]. Although the prevalence is nearly the same, several studies have investigated adults with IBS in primary care [21], although none on children were identified for this review.

Faresjö et al. examined the management of patients of *all* ages with IBS in general practice [23]. Their data indicate that IBS is managed differently in children and adults. Adults tend to undergo more laboratory testing and receive more medication prescriptions than children. Additionally, there are variations in the types of complementary investigations to which different age groups are referred.

A biopsychosocial approach

Only one study, Schurman et al. [18], mentions psychosocial elements such as reassurance, positive coping strategies or mental health support as part of the management. Puckett-Perez & Gresl highlight that cognitive behavioural therapy has proven highly effective for FAPDs [24]. They emphasise the critical role of parental support and recommend initiating pain education early in the treatment process. They also stress the importance of FAPD being a positive diagnosis. However, referrals to mental health professionals appear rare. Memarian et al. investigated US primary care paediatricians' use of speciality referrals when managing children with chronic abdominal pain and found that no children were referred to mental health specialists [25]. Our findings support this, as only one included study mentioned psychosocial elements as part of routine management. This indicates that key psychosocial elements recommended in IBS guidelines are rarely included in everyday primary care.

Recent evidence from Pop et al. indicates that anxiety and depressive symptoms are frequent in children with IBS, further reinforcing the need for a biopsychosocial approach. Psychological comorbidity, therefore, appears to be a relevant clinical factor to consider in primary care management [26]. Brodwall & Brekke similarly highlight the importance of follow-up, psycho-education and clear communication in the management of abdominal pain in children [27]. Unlike this review's findings, Norwegian general practitioners reported confidence in managing FGIDs without referrals to secondary care, which may reflect that these patients had already been diagnosed before presenting to general practice.

Irritable bowel syndrome compared with other functional abdominal pain disorders

IBS is the most common FAPD in children, making it especially important to study in clinical research. In this

review, children with recurrent, chronic and non-specific abdominal pain were included, as these conditions may all represent forms of FAPDs. Recurrent abdominal pain in children can have severe consequences; studies show that it increases the risk of subsequent psychiatric disorders [28] and that 25% may develop IBS in adulthood [29].

Though most recurrent abdominal pain is functional, not all cases are IBS (Figure 1). Hogervorst et al. highlighted differences between children with IBS and children with other subtypes of recurrent abdominal pain. They found that, after one year, children with IBS were more frequently referred to secondary care, had higher rates of laxative prescriptions, were more likely to develop chronic diarrhoea and experienced lower health-related quality of life than children without IBS [2]. Lisman-van Leeuwen et al. found similar results, showing that children with IBS tend to have a poorer prognosis than those with other FGIDs, with a higher prevalence, longer duration and more recurrence of chronic abdominal pain&; [30]. These findings demonstrate the need for more studies specifically focusing on IBS. Broader studies, including this one, may lead to inaccurate conclusions when they include too diverse a patient population.

Strengths and limitations

This review applied a broad search strategy and included all relevant peer-reviewed studies on the management of children with IBS or overlapping conditions. This approach increases the likelihood that relevant evidence was identified and reduces selection bias.

The included studies were heterogeneous and employed different approaches to describing children with FAPDs, making it challenging to compare the results. Three studies evaluated management before diagnosis, while one focused on management after diagnosis. One study was based on clinicians' presumed management rather than on actual clinical practice, potentially introducing recall bias. Generalisability is also limited as the US studies may not be directly comparable to Danish healthcare. A key limitation is that none of the included studies focused specifically on IBS. Instead, they addressed recurrent, chronic or non-specific abdominal pain in children – conditions that include IBS as one possible subtype. This approach was necessary as no studies focusing exclusively on IBS management were identified.

A further limitation is inconsistent terminology. “FAP” is sometimes used narrowly to denote FAP-NOS (functional abdominal pain – not otherwise specified) and occasionally broadly to describe all types of functional abdominal pain. Because FAP-NOS is a distinct subtype from IBS (Figure 1), studies focusing on FAP-NOS were excluded. However, the varying use of FAP increased the risk of inadvertently excluding relevant studies. The inconsistent use of FAP has been recognised by the Rome IV Committee and was the primary reason for renaming the diagnosis to FAP-NOS in the 2016 update [3]. Overall, the robustness of the synthesis is limited by heterogeneity and methodological weaknesses in the included studies, including inconsistent terminology, reliance on self-reported practice and the absence of studies specifically examining IBS management.

Implications for future research

More research is needed on how children with IBS are managed in general practice. Future studies should focus specifically on IBS and follow patients longitudinally from the first consultation through to diagnosis and treatment to clarify current practices.

Implications for practice

Primary care physicians should be familiar with the Rome Criteria to improve diagnostic accuracy for paediatric IBS. Using standardised guidelines can reduce misdiagnosis, unnecessary testing and missed cases. In addition, more consistent follow-up practices and integration of a biopsychosocial approach could improve outcomes and reduce chronicity in affected children.

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