

# The Knowledge and Therapeutic Approach of Paediatrician on Functional Constipation

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## ABSTRACT

**Background:** Functional constipation is one of the most common functional gastrointestinal disorders in children under 4 years of age. The Rome IV Criteria have standardized diagnostic criteria for functional constipation. The purpose of the study was to determine the knowledge and therapeutic approach of Indonesian pediatricians to functional constipation.

**Method:** A cross-sectional analytic observational study with the target of 101 pediatricians practicing in the daerah khusus ibukota (DKI) Jakarta area. This study provides an electronic questionnaire which was validated with facial and construct validity and the reliability was determined by Alpha-Cronbach value.

**Results:** The average duration of experience practicing as pediatricians was  $6.83 \pm 3.96$  years, with a range of 5-15 years (66.3%) with the majority working in non-teaching institutions (83.2%). Pediatricians' knowledge of functional constipation did not show a significant difference in score based on length of experience practicing as a pediatrician ( $p = 0.738$ ) and place of daily practice ( $p = 0.690$ ). A Significant difference was seen based on the use of Rome Criteria as a source of information on functional constipation ( $p = 0.047$ ). Five to fifteen years of experience practicing and teaching hospital as place of daily practice showed a higher therapeutic approach score, although this was not statistically significant. It turned out that using Rome Criteria as a source of information does not give higher therapeutic approach scores.

**Conclusion:** Periodic evaluation of pediatrician's knowledge and therapeutic approach is needed to maintain the quality of functional constipation care.

**Keywords:** Rome criteria, functional constipation, pediatricians

## ABSTRAK

**Latar belakang:** konstipasi fungsional adalah kelainan gastrointestinal fungsional tersering yang ditemukan pada anak usia kurang dari 4 tahun. Kriteria Rome IV adalah kriteria diagnostik standar untuk konstipasi fungsional. Tujuan studi ini adalah untuk mengetahui pengetahuan dan pendekatan tatalaksana dokter spesialis anak di Indonesia terkait konstipasi fungsional.

**Metode:** studi observasional dengan desain potong lintang dilakukan dengan target 101 dokter spesialis anak di daerah khusus ibukota (DKI) Jakarta. Studi ini menggunakan kuesioner elektronik yang telah dilakukan validasi rupa dan konstruk serta reliabilitas yang dinilai dengan Chronbach-alpha.

**Hasil:** rata-rata pengalaman kerja dokter spesialis anak adalah  $6.83 \pm 3.96$  tahun dengan rentang 5-15 years (66.3%) dan sebagian besar bekerja pada institusi non-pendidikan (83.2%). Pengetahuan mengenai konstipasi fungsional tidak menunjukkan perbedaan bermakna pada skor berdasarkan lama pengalaman kerja ( $p = 0.738$ ) dan tempat praktek ( $p = 0.690$ ). Perbedaan signifikan ditemukan pada penggunaan Kriteria Rome sebagai sumber informasi konstipasi fungsional ( $p = 0.047$ ). Pengalaman 5-15 tahun dan bekerja di institusi pendidikan menunjukkan skor pendekatan tatalaksana yang lebih tinggi, meskipun tidak bermakna secara statistik. Hal ini menunjukkan bahwa penggunaan Kriteria Rome sebagai sumber informasi tidak meningkatkan skor pendekatan tatalaksana.

**Simpulan:** evaluasi secara periodik mengenai pengetahuan dan pendekatan tatalaksana para dokter spesialis anak dibutuhkan untuk menjaga kualitas pelayanan konstipasi fungsional.

**Kata kunci:** Dokter spesialis anak, konstipasi fungsional, kriteria Rome

## INTRODUCTION

Functional constipation is one of the most common functional gastrointestinal disorders in children under 4 years of age. The prevalence of functional constipation in children from western countries is estimated at 1-31%.<sup>1-4</sup> There are no studies that describe the prevalence of functional constipation in Indonesian children, but a study in adults show a prevalence of 47.6 - 63.8%.<sup>5</sup> Based on Rome IV Criteria, the diagnosis of functional constipation is established based on the presence of at least 2 of the following symptoms: fewer than two defecations per week, history of stool retention, painful bowel movements, large stools, and the presence of a large fecal mass in the rectum.<sup>6</sup> Therefore the Rome IV Criteria have standardized diagnosis criteria and are very useful for clinical practice.

Although the Rome criteria have been around for a long time, most recently updated for the fourth time in 2016 as the Rome IV Criteria, there is great variety in its implementation in daily practice. Misperceptions in understanding the diagnostic criteria will cause the diagnosis of functional constipation to be less than optimal, resulting in both underdiagnosis and overdiagnosis, and even reduced cost-effectiveness.<sup>7</sup> A study of pediatricians in Europe found that only 40% of those surveyed used the Rome criteria to diagnose functional constipation.<sup>8</sup> Suboptimal functional constipation management may also have consequences on the quality of life of children in the future.<sup>2,9</sup>

Many factors can affect the knowledge and therapeutic approach of pediatricians in managing a disease, such as the knowledge and experience

gained during medical education, the duration of active practice as a pediatrician, as well as sources of information from where pediatricians obtain the latest knowledge and skills. To the author's knowledge, so far there have been no studies that assessed the knowledge and therapeutic approaches of pediatricians relating to functional constipation. The purpose of this study was to determine the knowledge and therapeutic approach of Indonesian pediatricians to functional constipation. The results of this study can be a reference for educators, working groups of professional organizations, and child health practitioners in effort to improve the quality of child health care.

## METHOD

This research is a cross-sectional analytic observational study with the target of pediatricians practicing in the DKI Jakarta area. This study provides an electronic questionnaire in Google forms, which consists of multiple-choice and short-answer questions regarding knowledge of diagnostic criteria and therapeutic approach to functional constipation. One hundred and one pediatricians who have practiced for at least 15 years in the DKI Jakarta area were selected by systematic randomization as subjects in this study. The 101 pediatricians were given an electronic Google form questionnaire. The form also contained informed consent explaining the purpose and usefulness of the research, as well as a statement of willingness to participate in the research voluntarily.

The questionnaire was validated with facial and construct validity. The questionnaire was reviewed

by 2 Gastrohepatology consultants to ensure that the questions represent the diagnostic criteria and therapeutic approaches that pediatricians must know. The questionnaires were initially distributed to 30 pediatricians. The data was analyzed using SPSS Statistics 20 for reliability and validity analysis. Reliability was determined by Alpha-Cronbach value. An alpha Cronbach value of above 0.6 is deemed to be sufficient for this questionnaire to be considered reliable. Validity was determined using inter-item correlation values. A correlation coefficient or r value greater than 0.3 is deemed to be sufficient for item validity. Items that do not meet the threshold was modified or deleted unless they are considered to be able to provide valuable information. The normality of the distribution was measured by a Kolmogorov-Smirnov test. A non-normal data distribution is equipped with a statistical description using the median value with the maximum and minimum limits. Mann-Whitney test was used to analyze the dependent and independent variables. This research has passed an ethical review with the number KET-017/UN2.F1.D1.2/ PDP01/AW/2020

**RESULTS**

From the 17 question items, 6 were found to be valid with inter-item correlations above 0.3, nine had inter-item correlation values of under 0.3, and two had zero variance. Fifteen questions that can be analyzed have Cronbach's Alpha > 0.6. Because the results of face validation stated that all questions were realistic for pediatricians to know, all questions were included as research questionnaires.

A total of 101 pediatricians responded to the study. The average duration of experience practicing as pediatrician was 6.83 ± 3.96 years, with a range of 5-15 years (66.3%), the majority worked in non-teaching institutions (83.2%). Ninety two (91.2%) pediatricians knew the Rome Criteria for diagnosing functional constipation (Table 1).

Two of the 5 functional constipation terms were answered correctly by > 80% of pediatricians and 1 term was answered correctly by only 34.7% of pediatricians. For alarm symptoms, 3 of the 4 terms were answered correctly by > 80% of pediatricians and the remaining one question was answered correctly by only 46.5% (Table 2).

Pediatrician knowledge of functional constipation did not show a significant difference in score based on length of experience practicing as a pediatrician (p = 0.738) and place of daily practice (p = 0.690).

Significant difference was seen based on the use of Rome Criteria as a source of information on functional constipation (p = 0.047) (Table 3).

**Table 1. Demographic breakdown of respondents**

Variables	n (%)
Length of experience practicing as pediatrician	
< 5 years	34 (33.7)
5-15 years	67 (66.3)
Place of daily practice	
Teaching hospital	17 (16.8)
Non-teaching hospital	84 (83.2)
Know the Rome Criteria for diagnose functional constipation	
Yes	92 (91.1)
No	9 (8.9)

**Table 2. Knowledge of Pediatricians for functional constipation**

Knowledge of pediatricians for functional constipation	Correct answer n (%)
Terminology of functional constipation of Rome Criteria IV	35 (34.7)
Less than 1 defecation per week*	
Large diameter stools	81 (80.2)
Excessive stool retention	82 (81.2)
History of painful bowel movements	62 (61.4)
Incontinence at least once a week*	66 (65.3)
Alarm symptoms in functional constipation	
Meconium not released at 7 days after birth*	47 (46.5)
Distended abdomen	90 (89.1)
Vomiting	85 (84.2)
Growth is not appropriate for age	91 (90.9)

\*questions with opposite answers

**Table 3. Correlations between demographic characteristics and knowledge scores**

Variable	Knowledge of pediatricians		p
	Median (min, max)	Mean	
Length of experience practicing as a pediatrician	13 (6-18)	12.59 ± 3.096	0.738
< 5 years	12 (2-18)	12.36 ± 3.374	
5-15 years			
Place of daily practice			0.690
Teaching hospital	14 (2-16)	12.47 ± 3.502	
Non teaching hospital	12 (4-18)	12.43 ± 3.242	
Rome Criteria as a source of information	12 (4-16)	12.78 ± 3.123	0.047
Yes	14 (2-18)	10.95 ± 3.551	
No			

Parental reassurance was given by all pediatricians in managing functional constipation. Of the 79 (78.2%) pediatricians who provided dietary intervention, only 40.5% of them correctly recommended against fiber intervention. Toilet training is recommended by 97% of pediatricians, but only < 70% is performed in accordance with recommendations. Indications for giving rectal laxatives were mostly (88.5%) based

on stool retention, and < 30% based on frequency of defecation. Lactulose as first choice treatment was recommended by 98.9% of pediatricians (Table 4).

**Table 4. Therapeutic approach of functional constipation**

Therapeutic approach	Correct answer n (%)
Parental reassurance (n = 101/100%)	101 (100)
Dietary intervention (n = 79/78.2%)	
Increasing fibre*	32 (40.5)
Stop breast milk*	79 (100)
Toilet Training (n = 98/97%)	
Child > 3 years old*	65 (66.3)
Sitting on the toilet after meals with feet	49 (50)
Usage of rectal laxatives (n = 87/86.1%)	
Stool retention	77 (88.5)
Child does not defecate for three day	24 (27.6)
Oral laxative (n = 89/88.1%)	
Lactulose as the first choice treatment	88 (98.9)

\*questions with opposite answers

The intervention of formula milk for non-breastfed infants was carried out by 68 (67.3%) pediatricians; 7 (10.3%) diluted milk, and others replaced with other formula milk based on various considerations. Fifty-six percent of pediatricians substituted with formula milk containing extensively hydrolyzed protein, 25% even replaced with formula milk containing amino acids. It should be noted that a pediatrician can perform more than 1 intervention (Table 5).

**Table 5. Formula milk interventions**

Dietary interventions	Total (n = 68) n (%)
Thinning the formula milk	7 (10.3)
Replace with different standard formula considering contents	26 (38.2)
Replace with formula milk containing soy	9 (13.2)
Replace with formula milk containing partially hydrolyzed protein	12 (17.6)
Replace with formula milk containing extensively hydrolyzed protein	38 (55.9)
Replace with formula milk containing amino acids	17 (25.0)

Of the 87 pediatricians who provided disimpaction therapy, most (92%) used microlax as a rectal laxative. Around 36.8% and 21.8% of pediatricians used glycerin and fleet enema as disimpaction therapy, respectively (Table 6).

A total of 89 (88.1%) pediatricians used oral laxatives as their therapeutic approach to patients who were constipated. Lactulose is an oral laxative used by the majority (98.9%) of pediatricians. There were 5.6%, 6.7%, and 13.5% of pediatricians using mineral oil, sorbitol, and PEG, respectively (Table 7).

**Table 6. Rectal laxatives used**

Types of rectal laxatives used	Total (n = 87) n (%)
Bisacodyl (Dulcolax suppository)	23 (26.4) 26.4%
Microlax	80 (92.0) 92.0%
Glycerin	32 (36.8) 36.8%
NaCl 0.9%	4 (4.6) 4.6%
Fleet enema	19 (21.8) 21.8%

**Table 7. Oral laxative used**

Types of oral laxatives used	Total (n = 89) n (%)
Lactulose	88 (98.9)
Sorbitol	6 (6.7)
Picosulphate (Laxoberon)	8 (9.0)
Dulcolax	10 (11.2)
Polyethylene Glycol (PEG)	12 (13.5)
Mineral oil	5 (5.6)

A total of 64 (63.4%) pediatricians gave supplementation to patients with constipation; 90.6% of them gave probiotics. There were 15 (23.4%) pediatricians providing fiber supplementation (Table 8).

Five to fifteen years of experience practicing as a pediatrician and teaching hospital of daily practice showed a higher therapeutic approach score, although this was not statistically significant. It turned out that Rome Criteria as a source of information does not give a higher score in the therapeutic approach (Table 9).

**Table 8. Supplementation**

Type of additional supplementation used	Total (n = 64) n (%)
Probiotics	58 (90.6)
Prebiotics	14 (21.9)
Fiber supplements	15 (23.4)

**Table 9. Correlations between demographic characteristics and therapeutic approach scores**

Variable	Therapeutic approach Median (min, max)	Mean
Length of experience practicing as a pediatrician		
< 5 years	6 (4-10)	6.71 ± 2.082
5-15 years	6 (2-12)	7.07 ± 2.211
Place of daily practice		
Teaching hospital	8 (4-10)	7.06 ± 2.015
Non Teaching hospital	6 (2-12)	6.93 ± 2.205
Source of information (Rome criteria)		
Yes	7 (2-10)	6.83 ± 2.108
No	8 (4-12)	7.31 ± 2.328

## DISCUSSION

The Rome Criteria as a diagnostic criteria for functional gastrointestinal that was introduced a long time ago, it has been adjusted four times, most recently in 2016 as the Rome IV Criteria. However, not all pediatricians who were respondents in this study applied these criteria. Of the 92 (91.1%) pediatricians who knew the Rome Criteria, as many as 75 (81.5%) applied Rome IV Criteria to diagnose functional constipation in daily practice, or about 74.3% (75/101) of total respondents. The remaining 17 (18.6%) pediatricians still used Rome III Criteria. Nine (8.9%) pediatricians did not know the Rome Criteria and relied on information they received during participating in continuing medical education (CME) programs.

Although most pediatricians used the Rome IV Criteria as their reference in diagnosing functional constipation, their understanding of the terminology is not fully satisfactory. Only 2 out of 5 terms were recognized correctly by > 80% of respondents. In fact, there is 1 terminology that was recognized correctly only by < 50% of respondents. The alarm symptoms generally have a better outlook, however there is still 1 out of 4 terms that is answered correctly by < 50% of respondents. Low and moderate scores indicate that some of the terminology for functional constipation is still not fully understood by some pediatricians. This understanding is very important because it is the basis for therapeutic approach.<sup>6</sup> Pediatricians who used the Rome Criteria as a source of information for functional constipation have significantly higher knowledge scores than those who did not use the Rome criteria. This difference was not seen with other factors such as length of experience practicing as a pediatrician and work place for daily practice. One study showed that older doctors were less likely to adhere to the guidelines, because they were less familiar with the changing guidelines.<sup>10</sup> This situation indicates that dissemination of appropriate and updated information is very important. Increasing awareness of Rome IV Criteria, with an emphasis on terminology that have low and moderate scores during CME activities is an option that needs to be considered.

The Rome criteria do not describe the management of functional constipation specifically, so that understanding of the management of constipation is obtained from various sources, ranging from CME activities and scientific articles, to social media. Parental reassurance as standard therapy for functional gastrointestinal disorders was carried out by all (100%) pediatricians who were respondents in this

study. As many as 78.2% of pediatricians perform dietetic intervention as a therapeutic approach. All pediatricians understood that functional constipation in infants is not a reason to stop breastfeeding. This can be seen from the fact that all pediatricians who carry out dietary interventions still recommend breastfeeding. Therapeutic approach relating to fiber intervention was answered correctly by 40% of pediatricians, which means that most pediatricians still recommend giving high fiber to infants who experience functional constipation. So far not many RCTs have studied the benefits of fiber intervention. Compliance of fiber intervention is generally poor and there is limited evidence showing that extra fiber prevented constipation. Five systematic reviews involving 111 studies showed that low fiber intake is associated with constipation, but there is insufficient evidence supporting that extra fiber intake reduces constipation compared to placebo. These systematic reviews do not support the use of fiber supplementation in the treatment of functional constipation and a normal fiber intake is recommended.<sup>11,12</sup> Another study recommends also do not support dietary intervention alone as first-line treatment for idiopathic constipation.<sup>13</sup>

Behavior therapy is recommended by 97% of pediatricians in treating functional constipation and 50-66% of them do it as recommended. However, studies of behavior therapy so far has low quality of evidence. Current evidence generally do not support the use of behavioral therapy in the treatment childhood constipation. Even though, expert opinion recommend guidance for toilet training in the treatment of childhood constipation in children with a developmental age of at least 3 or 4 years.<sup>12</sup> Widodo et al reported in their study that of the 74% of pediatricians who recommend toilet training in their constipated patients, only about 20% do so according to the recommendations.<sup>14</sup> Despite that, evidence suggests that late toilet training predisposes children to later constipation, highlighting the importance of toilet training over the specific methods.<sup>15</sup>

Giving rectal laxatives to children with functional constipation shows different therapeutic approaches as described by several existing studies, especially regarding the time of administration. The Rome IV criteria tolerates a frequency of defecation at least 2 times a week, in other words, if the child does not defecate for more than 3 days, it is necessary to consider giving rectal laxatives for impacted stool retention, especially if accompanied by strong straining during defecation. Of the 86.1% pediatricians who used

rectal laxatives to evacuate fecal retention, only < 30% of them recommended stool evacuation if the child had not defecated for 3 days. No placebo-controlled studies have evaluated the effect of oral laxatives or enemas on disimpaction. The available evidence shows that high dose polyethylene glycol (PEG) and enema are equally effective for fecal disimpaction. Based on the argument that PEG can be administered orally, experts decided to recommend PEG given for disimpaction.<sup>12</sup> Although there are no RCTs or limited trials related to dosage, duration, and long-term side effects, Microlax and Bisacodyl are two types of enemas that are quite widely used based on expert experience and opinion. As many as 32% of pediatricians use glycerin, although some studies suggest that rectal treatment with glycerine suppository be restricted to provide acute relief in functional constipation. Behaviorally conditioned children depending upon rectal stimulation to initiate stooling and glycerin may lead to irritation of the anus or rectal mucosa, causing symptoms to become chronic.<sup>13</sup>

A total of 89 (88.1%) pediatricians used oral laxatives as a therapeutic approach to functional constipation and most (98.9%) used lactulose. Only 12 (13.5%) pediatricians used PEG, although it is known that PEG is more effective compared with lactulose. One of the reasons for this situation is that the availability of PEG in the Indonesian market is still limited, so that awareness and its use is also limited. PEG has been widely available in the Indonesian market since early 2022. Lactulose is considered to be safe for all ages, but may cause flatulence. Polyethylene glycol is considered safe for infants age > 6 months. A study of oral laxative do not support the use of mineral oil as this risk lipoid pneumonia due to aspiration.<sup>13</sup> In our study, there were still 5 (5.6%) pediatricians who used mineral oil in their therapeutic approach. A delayed therapeutic treatment is negatively associated with recovery.<sup>7</sup> Delay in initial medical treatment for > 3 months from symptom onset correlates with longer duration of symptoms.<sup>16</sup>

Harder stools are frequent in infants fed with formula milk containing certain constituents and excessive concentration of formula. Therefore, it is recommended to verify that the composition and formula preparation is correct. Nutritional advice may not be sufficient for nonexclusively breastfed infants, so laxatives may be required as first-line treatment.<sup>13</sup> Constipation is rare in breastfed infants, therefore alternative causes of constipation should be considered but some breastfed infants may defecate < 1 per week.

It is recommended to continue breastfeeding and evaluate after 2-4 weeks.<sup>13</sup>

The pathophysiological mechanism of intake of cow milk protein on the incidence of constipation is still unclear, it is typically associated with the activation of mast cells and anal sphincter dysfunction. Constipation as a manifestation of CMPA is extremely rare. There is no consensus that extensively hydrolyzed formula is indicated for constipated infants.<sup>17,18</sup> Available data show that up to 30% of infants with cow's milk protein allergy are constipated.<sup>19</sup> This may explain why in our study it was found that up to 56% of pediatricians considered constipation as a symptom of CMPA, so they substituted formula milk that was being consumed by infants with formula milk for the management of CMPA.

Supplementation of probiotics and prebiotics was given by 58 (57.4%) and 14 (13.9%) of the 101 pediatricians who were respondents in this study. Although some studies showed their promise as a treatment for constipation the quality of evidence is very low, and thus does not support the use of probiotics and prebiotics in the treatment of childhood constipation. Therefore, the routine use of probiotics and prebiotics is not recommended in the treatment of childhood constipation.<sup>12</sup>

Rome IV criteria do not specify a specific treatment approach, because it is intended to establish the diagnosis of various functional gastrointestinal disorders, one of them being functional constipation. Information regarding the therapeutic approach to functional constipation was obtained from various sources ranging from medical journals, international to national professional organization guidelines (Indonesian Pediatric Society). Continuing medical education (CME) plays an important role in improving the ability of the pediatrician to improve their therapeutic approach to constipation. A study shows the role of CME and the quality of information in improving physician performance.<sup>20</sup> This can explain why in this study, Rome Criteria IV as a source of information did not provide a significant difference to the understanding of pediatricians regarding the therapeutic approach as there are many other sources of legitimate information. The interrelationship between variables that can affect the skills of pediatricians, may be the reason that there are no significant differences between each variable in this study.

In order to provide optimal and standardized management, pediatricians require standardized diagnostic criteria and therapeutic approach guidelines

as well. Although the Rome IV Criteria have been widely used, guidelines from professional organizations are also widely socialized, and thus existing diagnostic criteria and guidelines must be translated and adapted to local conditions to become standard diagnostic criteria and therapeutic approaches, which will be followed by pediatricians in their work area. The data obtained from this study can be an input for educators and working groups of professional organizations, in approaching the problem of functional constipation, especially with regard to points that have low scores of understanding and therapeutic approach.

## CONCLUSION

The management of functional constipation is very complex, so it is necessary for pediatricians to have updated knowledge and therapeutic approach. Availability of standard diagnostic criteria and therapeutic approach guidelines from professional organizations must be ensured that they have been updated and properly disseminated and applied. Periodic evaluation of knowledge and therapeutic approach by professional organizations is needed as an effort to provide better health services and quality of life for children.

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