

## BLADDER SYMPTOMS IN CHILDREN WITH FUNCTIONAL CONSTIPATION : SYSTEMATIC REVIEW

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### Abstract

**Background:** Functional constipation (FC) affects 3% of children worldwide. FC occurs in 95% of children without an organic reason. Lower urinary tract symptoms (LUTS) and urinary tract infection (UTI) often co-occur. The International Children's Continence Society (ICCS) coined the term bladder and bowel dysfunction (BBD) to stress the frequent combination of bladder and bowel issues.

**Aim:** The purpose of this research is to investigate bladder symptoms in children with functional constipation.

**Methods:** This study confirmed that it met all of the requirements by evaluating the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 criteria. This allowed the researchers to guarantee that the study was as current as possible. Publications that were published between 2015 and 2023 were incorporated into the search strategy, which encompassed a number of different electronic reference databases (including Pubmed and SagePub). We did not consider review papers, duplicate publications, or articles that were only partially written.

**Result:** PubMed database search results yielded 213 articles, while SagePub database search results yielded 112 articles. In 2015, the search results for SagePub returned 13 articles while PubMed returned 19 articles. We compiled a total of eight articles (6 from PubMed and 2 from SagePub) and included three studies that met the inclusion criteria.

**Conclusion:** We can't say for sure how often bladder problems show up in children with FC. This is because the frequency varies a lot, so there aren't many studies. However, children with FC do often have bladder complaints.

**Keyword:** Bladder; Functional constipation; Lower urinary tract symptoms

**INTRODUCTION**

Functional constipation (FC) affects 3% of children worldwide. FC occurs in 95% of children without an organic reason. It is more common in preschoolers than in otherwise healthy one-year-olds. Stools should be passed easily, regardless of bowel movement frequency.<sup>1-3</sup> Most people poop regularly. Functional constipation can include painful defecation, hard stools, infrequent bowel movements, and a feeling of incomplete stool evacuation. It usually has no systemic or anatomical cause. Environment, stress, food, coping skills, and social support are usually contributors.<sup>3,4</sup>

FC is a common pediatric disease that varies locally. North and South America (including infants–adolescents) has a prevalence of 10%–23%, while Europe (including children) has a 0.7%–12% incidence. Asia has 0.5%–29.6%.<sup>5,6</sup> The clinical diagnosis of functional constipation is based on a history and physical examination. Parents frequently report feces as little and hard, "like little stones," yet some describe occasional, massive bowel movements as "so large I can't believe it came out of him." A history of bright red blood in the stool alongside large, difficult bowel movements may be indicative of rectal fissures resulting from difficult bowel movements.<sup>7</sup>

Lower urinary tract symptoms (LUTS) and urinary tract infection (UTI) often co-occur. The International Children's Continence Society (ICCS) coined the term bladder and bowel dysfunction (BBD) to stress the frequent combination of bladder and bowel issues.<sup>8</sup> Clinical specialists estimate 30% of FC children suffer bladder problems, ranging from 12-46%. Bladder and bowel issues, especially when combined, can affect bladder and kidney function and psychosocial well-being. Focusing on one illness may compromise diagnosis and treatment.<sup>9-11</sup>

The objective of this study is to determine bladder symptoms in children with functional constipation.

**METHODS**

The author of this study made certain that it was up-to-date and adhered to all of the relevant guidelines by ensuring that it was in accordance with the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 criteria. Because of the importance of ensuring that the findings of the inquiry are reliable, this step is essential. The findings of this study showed that children who suffer from functional constipation experience symptoms in their bladders. The most effective method for achieving this goal in a timely manner is to first examine the prior research that has been conducted on the subject. The significance of the issues that have been brought up will be illustrated in this section as part of an effort to meet the aim of this essay.

In order for researchers to be allowed to take part in the inquiry, it was necessary for them to provide evidence that they fulfilled the following requirements: 1) In order for the paper to be considered for publication, it must be written in English, and the primary focus of the paper must be on the bladder symptoms that are seen in children who have functional constipation. 2) For the purpose of this review, works that were published after 2015 but before the evaluation period will be taken into consideration. Editorials, applications without a DOI, review articles that have been previously published, and entries that are almost identical to journal papers that have been previously published are examples of types of research that cannot be published.

We used "bladder symptoms"; "children" and "functional constipation" as keywords. The search for studies to be included in the systematic review was carried out from May, 28<sup>th</sup> 2023 using the PubMed and SagePub databases by inputting the words: (*"bladder s"[All Fields] OR "urinary bladder"[MeSH Terms] OR ("urinary"[All Fields] AND "bladder"[All Fields]) OR "urinary bladder"[All Fields] OR "bladder"[All Fields] OR "bladders"[All Fields]) AND ("diagnosis"[MeSH Subheading] OR "diagnosis"[All Fields] OR "symptoms"[All Fields] OR "diagnosis"[MeSH Terms] OR "symptom"[All Fields] OR "symptom s"[All Fields] OR "symptomes"[All Fields]) AND ("child"[MeSH Terms] OR "child"[All Fields] OR "children"[All Fields] OR "child s"[All Fields] OR "children s"[All Fields] OR "childrens"[All Fields] OR "childs"[All Fields]) AND ("functional"[All Fields] OR "functional s"[All Fields] OR "functionalities"[All Fields] OR "functionality"[All Fields] OR "functionalization"[All Fields] OR "functionalizations"[All Fields] OR "functionalize"[All Fields] OR "functionalized"[All Fields] OR "functionalizes"[All Fields] OR "functionalizing"[All Fields] OR "functionally"[All Fields] OR "functionals"[All Fields] OR "functioned"[All Fields] OR "functioning"[All Fields] OR "functionings"[All Fields] OR "functions"[All Fields] OR "physiology"[MeSH Subheading] OR "physiology"[All Fields] OR "function"[All Fields] OR "physiology"[MeSH Terms]) AND ("constipation"[MeSH Terms] OR "constipation"[All Fields] OR "constipated"[All Fields] OR "constipating"[All Fields] OR "constipations"[All Fields])*) used in searching the literature.

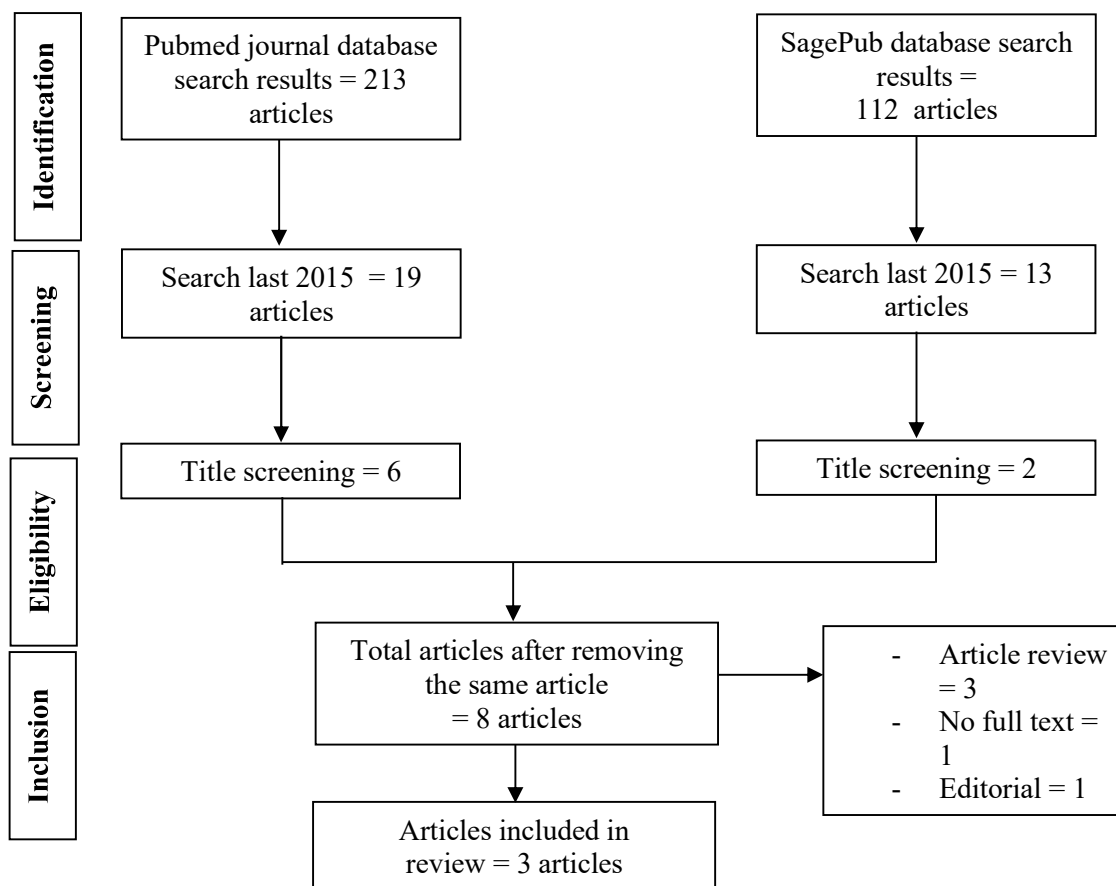


Figure 1. Article search flowchart

When determining the reliability of each study, we looked at both the abstract and the title. After that, they looked through other historical documents. This finding is based on a compilation of findings from several analyses that used the same methodology. Comments written in unpublished English are required. Only works that were able to satisfy a set of predetermined requirements were considered for inclusion in the systematic evaluation. The scope of the search results is narrowed as a result of this. There is insufficient analysis of the findings of the research. Following that is the analysis. The paper explains who the subjects were, who wrote the paper, when it was published, where the study was done, what it was about, and its parameters. The paper also details who wrote the paper and when it was published. Endnote cleaned up the list of results by removing any instances of duplicate entries. The titles and abstracts of the articles were analyzed by two different reviewers.

At first, their complete papers were analyzed in order to ascertain whether or not they qualified for the study and to generate data. GWG and a variety of other health concerns have been the subject of conference presentations and investigations in the past. During the course of the deliberations, the judges came to a conclusion. Before deciding which papers to analyze in deeper depth, each author read through all of the abstracts and titles of the papers first. The next step will be for us to investigate all of the papers that deserve to be included in the review since they match the inclusion criteria for the review. Following that, we will select the topics for the review depending on what we have learnt about the various subjects. The papers that are to be researched as well as those that are to be reviewed are selected in this manner.

**RESULT**

Our search results on the PubMed database returned 213 articles, while on SagePub we found 112 articles. The search results for the last year of 2015 returned 19 articles for PubMed and 13 articles for SagePub. Ultimately we had a combined 8 articles (6 from PubMed and 2 from SagePub), then included three eligible studies.

Sampaio, et al (2016)<sup>12</sup> showed LUTD was 9.1%, mostly in girls (15 vs 3.1%,  $p < 0.001$ ). Boys had 9.4% constipation and girls 12.4% ( $p = 0.169$ ). LUTD was 6.8 times more prevalent in constipated children ( $p < 0.001$ , coefficient and correlation = 0.411). 8.2% of children without LUTD and 35.2% with LUTD had constipation. Multivariate research identified urine symptoms that independently predict constipation. Infrequent urination and holding motions were independent predictors ( $p = 0.004$ ). According to Rome III, constipated children had a lower DVSS ( $p < 0.001$ ). 12.6% of kids with nocturnal enuresis had constipation. This connection was not significant ( $p = 0.483$ ).

**Table 1. The literature include in this study**

Author	Origin	Method	Sample	Result
Sampaio, 2016 <sup>12</sup>	Brazil	Cross-sectional study	829 children and adolescents	Children who were constipated had a 6.8 times higher risk of having LUTD than children who did not have constipation. In children who have constipation, urine symptoms can include infrequent urination and holding maneuvers, both of which are independent causes that contribute to urinary manifestations. Children who have constipation of a more severe degree tend to exhibit more obvious urine symptoms. There was no correlation found between the presence of enuresis and constipation.
Lonkhuyzen, 2017 <sup>13</sup>	Netherland	Cross-sectional study	1,748 children	The symptoms of constipation and abdominal pain, as diagnosed by physicians, as well as the symptoms of hard stools and bloating, as reported by parents, worsened as the patient moved from primary to tertiary care. There are differences in the prevalence of symptoms that are reported by parents and those that are diagnosed by physicians. In any type of hospital environment, locomotor difficulties are the norm.
Abreu, 2018 <sup>14</sup>	Brazil	Cross-sectional study	516 women	In especially among the younger population, functional constipation is linked to overactive bladder and its dry subtype. This association holds true regardless of age. Additionally, this relationship is to blame for lower quality of life scores, particularly when urine incontinence is present in the patient. When there are manual motions involved and fewer than three defecations in a week, this should alert us to the possibility of an overactive bladder.

Other study in Netherland showed daytime urinary incontinence ( $P = 0.039$ ) and enuresis ( $P < 0.001$ ) were more diagnosed in primary healthcare, whereas constipation ( $P < 0.001$ ) and abdominal pain ( $P = 0.009$ ) increased from primary to tertiary healthcare. All parent-reported symptoms occurred more frequently than indicated by the physicians. Poor agreement between physicians' diagnoses and parent-reported symptoms was found ( $k = 0.16$ ). Locomotor problems prevailed in all healthcare settings, motor skills ( $P = 0.041$ ) and core stability ( $P = 0.015$ ) significantly more in tertiary healthcare.<sup>13</sup>

Abreu, et al (2018)<sup>14</sup> showed FC was associated with overactive bladder and dry overactive bladder, with functional constipation predicting dry overactive bladder (odds ratio [OR] = 2.47). Quality of life was poorer in constipated women compared to non-constipated and even worse in constipated women with wet overactive bladder (median = 22.5; 95% CI = 17.25-35.25). Manual maneuvers were significantly associated with both overactive bladder subtypes. Independent predictive factors for overactive bladder were manual maneuvers (OR = 2.21) and <3 defecations/week (OR = 2.18), with the latter being the only predictive factor for dry overactive bladder (OR = 3.0).

**DISCUSSION**

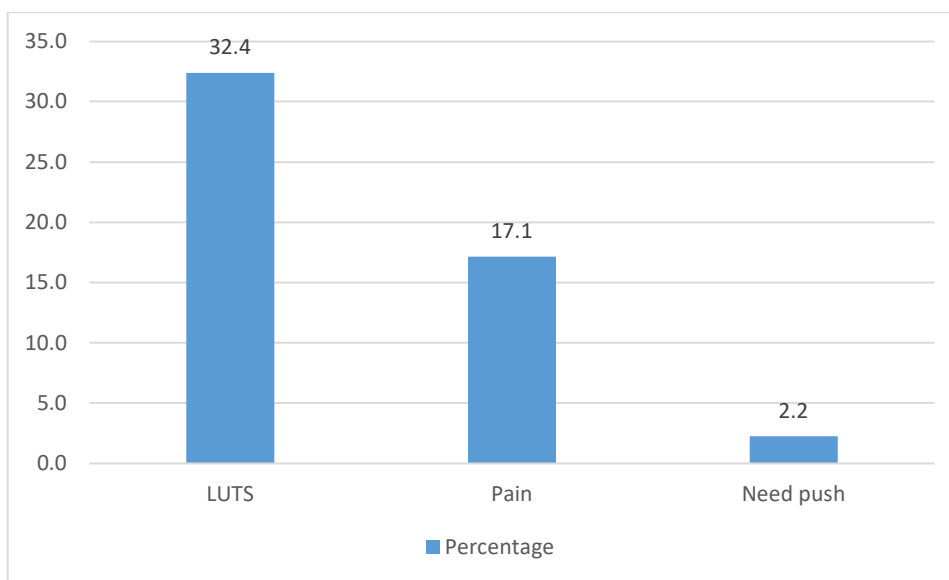
Clinical manifestations of paediatric lower urinary tract dysfunction (LUTD) include overactive or underactive bladder, frequent or infrequent urination, voiding postponement, urgency, enuresis, and nocturia. LUTD may be associated with neuropsychiatric disorders and gastrointestinal dysfunctions, with constipation being the most prevalent comorbidity. Constipation is commonly characterized by infrequent bowel movements (less than three per week), abnormally large stools, and difficult or excruciating defecation. Functional constipation is a prevalent issue in childhood, affecting up to one-third of children.<sup>15,16</sup>

It suggests that children from 4 to 17 years who have FC have an increased risk of developing bladder symptoms. The prevalence of lower urinary tract symptoms (LUTS) has been estimated to be around thirty percent in children diagnosed with FC.<sup>9</sup> However, our research suggests that this could be an underestimate of the true prevalence. Indeed, our research showed that the prevalence of LUTS ranged from 37–64 percent. It is believed that the timely diagnosis and treatment of

bladder disorders in children who have FC is critical for the prevention of deleterious consequences on renal function, bladder function, and psychosocial well-being.<sup>17,18</sup>

Because BBD manifests itself across such a broad spectrum, the condition is not often recognized by the kid, the family, or the referring professional. More often than not, it is the child's secondary symptoms, such as urine and/or faecal incontinence or urinary tract infection (UTI), that lead to the child being reviewed by experts.<sup>18</sup> As a result, the diagnosis of BBD is frequently delayed, and the therapy is primarily symptomatic care. This increases the risk of longer-lasting and more serious disorders, such as recurrent UTIs, faecal impaction, rectal prolapse, vesicoureteral reflux, renal failure, and IBS.<sup>17</sup>

The tendency for clinicians to underdiagnose BBD was also shown in a study in which parents reported more concurrent bladder and bowel difficulties than physicians did, independent of the healthcare setting.<sup>13</sup> This underscored the fact that clinicians have a tendency to underdiagnose BBD. As a result, we advise healthcare professionals to keep an eye out for youngsters presenting with FC who also have difficulties with their bladders. Constipation management is the initial stage in the treatment process for children who have BBD.<sup>19</sup>



**Figure 2.** Bladder symptoms in patients with FC

It has been established that relieving bowel dysfunction can lessen the frequency of urinary incontinence (UI). During the process of assessing the effectiveness of treatment, it is necessary to track whether or not the patient's symptoms of constipation and bladder dysfunction have improved.<sup>19</sup> Children who have both FC and bladder symptoms can receive treatment at a general pediatrician or in primary care settings. When sufficient management of constipation has not been obtained after six months, or when only a partial response has been achieved, a referral to a specialist should be considered.<sup>17</sup>

The nerves, muscles, connective tissues, and mucosa that make up the urine bladder and the gastrointestinal tract, as well as the coordinated interactions that occur between these tissue types, are essential to the normal operation of these organs. The presence of muscle instability in both the colon and the bladder as a result of prolonged BBD is suggestive that BBD has an effect on the muscles and nerves that control the normal operation of the intestine and the bladder. The formation of bladder-bowel cross-organ sensitization via overlapping neuronal pathways at both the peripheral and central levels is one mechanism that has been proposed to explain this phenomenon.<sup>17</sup>

Constipation caused mice to have more frequent urination with smaller amounts of urine passed with each void, according to tests measuring spontaneous voiding behavior. It's likely that huge stools in the colorectum take up space in the abdominal area, which inhibits the bladder from expanding completely and contributes to a lower functional bladder capacity. Cystometry, an independent in vivo measure of bladder function, indicated increased urine frequency in conjunction with a lower functional bladder capacity in the group that was experiencing constipation. In addition to this, a higher NVC revealed that the bladder was overactive.<sup>17</sup>

According to these findings, constipation in younger people might cause LUTS and contribute to the development of BBD. As was mentioned in the section on voiding behavior in mice, the control animals used in urodynamic studies on awake mice typically relocated to a different portion of the cage right before they started voiding. This is a normal aspect of the voiding behavior in mice. Constipation has also been linked to an increased risk of UTIs in children, and UTIs can elicit symptoms that are very similar to those of overactive bladder.<sup>20</sup>

The findings of the urinalysis showed normal values for both groups, which indicates that UTIs and bladder lesions were not the cause of the LUTS that was detected in the group that had constipation. Cystometry revealed that the volume of urine that was voided during each micturition cycle was about equivalent to the volume of fluid that was infused, and there was no evidence of an intermittent void in any of the two groups of mice.<sup>20</sup> The accumulation of these findings points to the conclusion that neither bladder outlet blockage nor detrusor-sphincter dyssynergia developed in the animals that were subjected to the urodynamic testing while they were constipated.<sup>21</sup>

Histological investigation further verified that there was no evidence of detrusor hypertrophy or fibrosis in the bladder; this indicates that there was no bladder outlet obstruction that occurred along with the constipation in this study.<sup>21</sup> First, the overly swollen colorectum put more pressure on the outside of the bladder. This added to the rise in intravesical pressure without causing urination (NVCs). Second, the convergent neurons that receive afferent inputs from both the colon and the bladder were probably constantly excited by the afferent inputs from both the colon and the bladder. This likely caused the convergent neurons to send abnormal signals to the bladder, making it feel more painful and cause overactive symptoms.<sup>22</sup>

## CONCLUSION

Regarding the frequency of bladder symptoms in children who have FC, we are unable to provide definite answers at this time. Although bladder symptoms do occur with a substantial frequency in children who have FC, studies are uncommon because of the broad diversity in prevalence. This is despite the fact that research do exist.

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