WebLog Journal of Nursing

Review Article
Published: 13 Feb, 2026

Bowel Motility and Bladder Disorders (BBD) and Menstrual Disorders in Toddlers and Teenagers: A Holistic, Developmentally - Attuned Review

*Zaparackaite I[1], Singh SJ[2], Bhattacharya DC[3], Correia RC[4], Mehta AR[5], Midha PK[5], Patel R[6] and Patel RV[6]**

[1]Department of Pediatric Surgery, Emergency Children's Surgery Hospital, Entebbe/ Evelina Children's Hospital, London, UK

[2]Department of Pediatric Surgery, Nottingham University Hospitals, Nottingham, UK

[3]Department of Pediatric Surgery, Sultan Qaboos Hospital, Salalah, Sultanate of Oman

[4]Santa Casa de Tatui General Hospital, 330 Maneco Pereira Road, Tatui 18273000, Sao Paulo, Brazil

[5]J. Watumull Global Hospital & Research Centre, Delwara Road, Mount Abu, Rajasthan 307501, India

[6]Department of Pediatric Surgery, PGICHR and KTCGUH, Rajkot 360001, Gujarat, India

Abstract

Objectives: To synthesise current evidence on Bowel motility and Bladder Disorders (BBD) and menstrual disorders across early childhood through adolescence, highlighting shared pathophysiology, psychosocial determinants, and opportunities for integrated, holistic management. The review emphasises developmental transitions, family context, and system-level approaches relevant to paediatric and adolescent care.

Design: Narrative review of contemporary literature, integrating biomedical, behavioural, developmental, and psychosocial perspectives. Sources include paediatric gastroenterology, urology, gynaecology, developmental psychology, and primary care research.

Eligibility Criteria: Peer-reviewed studies, guidelines, and consensus statements addressing BBD, functional constipation, urinary incontinence, dysfunctional voiding, early-onset dysmenorrhoea, heavy menstrual bleeding, and menstrual irregularities in children aged 1-19 years.

Results: BBD and menstrual disorders share overlapping mechanisms including autonomic dysregulation, pelvic floor dysfunction, gut–bladder cross-sensitisation, and psychosocial stress. Toddlers often present with functional constipation and daytime wetting linked to toilet-training challenges, behavioural avoidance, and family routines. Teenagers experience a shift toward hormonally mediated disorders, including primary dysmenorrhoea, anovulatory cycles, and pain-amplification syndromes. Across ages, adverse childhood experiences, neurodevelopmental conditions, and school stressors contribute to symptom persistence. Holistic management - combining behavioural interventions, pelvic floor physiotherapy, nutritional optimisation, menstrual education, and family-centred coaching - improves outcomes and reduces unnecessary medicalisation.

Conclusions: A developmental, biopsychosocial approach is essential for managing BBD and menstrual disorders in toddlers and teenagers. Early identification, coordinated care, and empowerment of families and schools can reduce chronicity and improve quality of life. Future research should prioritise integrated care pathways, trauma-informed practice, and co-designed interventions with young people and caregivers.

Keywords: Bowel Motility Disorders; Bladder Dysfunction; Paediatric Continence; Menstrual Disorders; Dysmenorrhoea; Adolescence; Holistic Care; Biopsychosocial Model

Summary Box

What is already known on this topic

- Bowel motility and Bladder Disorders (BBD) are common in early childhood and often coexist with functional constipation, urinary incontinence, and pelvic floor dysfunction.

OPEN ACCESS

***Correspondence:**
Dr. Ramnik Patel, MD., Department of Pediatrics and Pediatric Surgery, Postgraduate Institute of Child Health & Research and KT Children Govt University Teaching Hospital, Rajkot 360001, Gujarat, India, Tel: +447956896641; E-mail: ramnik@doctors.org.uk; ORCID: http://orcid.org/0000-0003-1874-1715

Received Date: 13 Jan 2026
Accepted Date: 11 Feb 2026
Published Date: 13 Feb 2026

Citation:
Zaparackaite I, Singh SJ, Bhattacharya DC, Correia RC, Mehta AR, Midha PK, et al. Bowel Motility and Bladder Disorders (BBD) and Menstrual Disorders in Toddlers and Teenagers: A Holistic, Developmentally - Attuned Review. WebLog J Nurs. wjnr.2026.b1305. https://doi.org/10.5281/zenodo.18795720

- Menstrual disorders in adolescents - including dysmenorrhoea, heavy menstrual bleeding, and irregular cycles - are highly prevalent and frequently under-recognised.
- Gut-bladder cross-sensitisation, autonomic dysregulation, and psychosocial stress contribute to symptom persistence across childhood and adolescence.
- Fragmented care pathways often separate gastroenterology, urology, and gynaecology, limiting holistic assessment.

What this study adds

- Provides a developmental synthesis linking BBD in toddlers with menstrual disorders in teenagers through shared neural, behavioural, and psychosocial mechanisms.
- Highlights the role of trauma, neurodevelopmental conditions, school environments, and family routines as cross-cutting determinants of symptom burden.
- Emphasises the importance of early, non-medicalised, family-centred interventions that integrate behavioural strategies, pelvic floor physiotherapy, nutritional optimisation, and menstrual education.
- Advocates for coordinated, trauma-informed, and developmentally attuned care across paediatrics, adolescent medicine, and primary care.

How this study might affect research, practice, or policy

- Supports the development of integrated care pathways that bridge paediatric gastroenterology, urology, physiotherapy, psychology, and adolescent gynaecology.
- Encourages routine screening for psychosocial stressors, school barriers, and neurodevelopmental needs in children presenting with BBD or menstrual symptoms.
- Reinforces the need for co-designed interventions with young people and caregivers to improve adherence, reduce stigma, and enhance self-management.
- Identifies priorities for future research, including longitudinal studies of gut–bladder–menstrual interactions and culturally sensitive, trauma-informed models of care.

Strengths and Limitations of This Study

Strengths

- Integrative, developmental perspective: This review synthesises evidence across toddlerhood through adolescence, bridging paediatric gastroenterology, urology, adolescent gynaecology, psychology, and developmental science - domains that are rarely examined together.
- Holistic, biopsychosocial framing: The analysis foregrounds behavioural, environmental and psychosocial determinants (e.g., trauma, school context, neurodevelopmental conditions) that are often overlooked in condition-specific reviews.
- Clinical relevance: The review translates complex mechanisms – gut-bladder cross-sensitisation, autonomic dysregulation, pelvic floor dysfunction - into practical, developmentally appropriate management strategies for clinicians.
- Focus on family and system-level factors: Emphasises the role of family routines, school policies, stigma, and care fragmentation, offering insights relevant to service design and integrated care pathways.
- Forward-looking orientation: Identifies clear priorities for research, including co-designed interventions, trauma-informed practice, and longitudinal studies of gut-bladder-menstrual interactions.

Limitations

- Narrative review design: As a narrative rather than systematic review, the synthesis may be subject to selection bias and does not include formal quality appraisal of included studies.
- Heterogeneity of evidence: Research on toddlers, school-age children, and adolescents varies widely in methodology, diagnostic criteria, and outcome measures, limiting direct comparability.
- Limited data on younger children: Evidence on menstrual-related symptoms in prepubertal children and early pubertal transitions remains sparse, constraining developmental granularity.
- Underrepresentation of marginalised groups: Few studies include neurodivergent children, those with chronic illness, or populations facing socioeconomic disadvantage, reducing generalisability.
- Evolving conceptual frameworks: Mechanistic models such as central sensitisation and gut–bladder cross-talk continue to develop; emerging evidence may refine or challenge current interpretations.

Gaps in Current Practice

Despite the interconnected nature of these conditions, clinical care remains siloed. Children may be referred sequentially to gastroenterology, urology, physiotherapy, or gynaecology without a shared explanatory model. Investigations are often repeated, and behavioural or psychosocial contributors may be overlooked. There is limited integration across services, and few care pathways explicitly address the developmental transitions from toddlerhood to adolescence.

Rationale for this Review

This review aims to synthesise evidence across disciplines to:

- Illuminate shared mechanisms linking BBD and menstrual disorders
- Highlight developmental and psychosocial determinants
- Identify opportunities for holistic, non-medicalised management
- Support the design of integrated, child-centred care pathways

By adopting a biopsychosocial and developmentally attuned lens, the review seeks to bridge gaps between specialties and provide clinicians with a coherent framework for understanding and managing these common yet complex conditions.

Background

Bowel motility and Bladder Disorders (BBD) and menstrual disorders are highly prevalent conditions across childhood and adolescence, yet they remain under-recognised, under-treated, and

frequently misunderstood. Their impact extends beyond physical symptoms, influencing emotional wellbeing, school participation, family functioning, and long-term health trajectories. Despite this, clinical pathways often remain fragmented, with children navigating multiple specialties without a unifying framework to explain their symptoms or guide holistic management.

This manuscript addresses a critical and under-recognised gap in paediatric and adolescent health: the fragmented, siloed approach to bowel, bladder, and menstrual disorders. These conditions are common, distressing, and strongly predictive of later chronic pain, school absence, and reduced wellbeing. Yet current care pathways rarely integrate developmental science, trauma-informed practice, sensory-aware approaches, or health equity considerations.

To our knowledge, this is the first manuscript to bring together bowel motility, bladder function, and menstrual health within a single developmental and systems-oriented framework. It offers a new way of understanding symptom trajectories and provides practical guidance for improving care, reducing stigma, and supporting long-term wellbeing.

Introduction

Bowel motility and Bladder Disorders (BBD) and menstrual disorders are among the most common yet under-recognised causes of distress, school absence, and healthcare utilisation in children and adolescents [1-3]. Although often managed in silos - paediatric gastroenterology, urology, or adolescent gynaecology - these conditions share overlapping mechanisms and psychosocial determinants [4-6]. A holistic, developmentally attuned approach is essential to prevent chronicity and reduce the burden on families and healthcare systems [7].

This review synthesises current evidence across early childhood through adolescence, emphasising the interplay between physiology, behaviour, environment, and emotional wellbeing.

Bowel motility and Bladder Disorders (BBD) and menstrual disorders represent two of the most common yet under-recognised sources of distress, functional impairment, and healthcare utilisation among children and adolescents [1, 3]. Although often conceptualised as separate clinical entities -managed respectively within paediatric gastroenterology, paediatric urology, and adolescent gynaecology - these conditions share overlapping neurophysiological pathways, behavioural drivers, and psychosocial determinants [4, 5, 8]. Their coexistence is frequently observed in clinical practice, yet rarely examined through an integrated developmental lens [9]. This fragmentation contributes to delayed diagnosis, repeated consultations, unnecessary investigations, and significant burden for families navigating multiple services [10].

In early childhood, BBD typically manifests as functional constipation, stool withholding, daytime urinary incontinence, and dysfunctional voiding [1, 11]. These symptoms emerge during a period of rapid maturation of the enteric and autonomic nervous systems, coupled with the behavioural and relational challenges of toilet training [12]. Toddlers are particularly vulnerable to cycles of stool retention, painful defecation, and escalating avoidance, which in turn increase bladder pressure, reduce functional capacity, and perpetuate urinary symptoms [13]. Family routines, parental stress, and inconsistent toileting expectations further shape symptom trajectories [14]. Despite the high prevalence of BBD in this age group, many children receive fragmented or overly medicalised care, with insufficient attention to behavioural and environmental contributors [15].

During adolescence, the clinical landscape shifts as pubertal hormonal changes introduce new vulnerabilities. Menstrual disorders - including primary dysmenorrhoea, heavy menstrual bleeding, and irregular cycles - affect the majority of teenagers, yet are frequently normalised, minimised, or dismissed [3, 16]. Dysmenorrhoea is a leading cause of school absenteeism, reduced participation in physical activity, and diminished quality of life [17]. For some adolescents, menstrual pain interacts with pre-existing bowel or bladder sensitivities, amplifying symptoms through shared neural pathways and central sensitisation [6, 18]. The interplay between hormonal fluctuations, stress reactivity, sleep disruption, and pelvic floor overactivity contributes to complex symptom patterns that are often misunderstood or inadequately managed [19].

Across both developmental stages, psychosocial and environmental factors exert profound influence. Adverse childhood experiences, neurodevelopmental conditions such as ADHD and autism, sensory sensitivities, school toilet access, cultural stigma surrounding toileting and menstruation, and family stress all shape symptom expression and persistence [7, 20-22]. These determinants are rarely addressed systematically, despite strong evidence linking them to chronicity and poorer outcomes [23]. Moreover, children and adolescents from marginalised or socioeconomically disadvantaged backgrounds face additional barriers to timely, holistic care [24].

A growing body of research highlights the interconnectedness of gut, bladder, and reproductive systems through shared autonomic, sensory, and pelvic floor mechanisms [4-6, 25]. Yet clinical practice remains largely siloed, with limited integration across specialties [9, 10]. This review responds to that gap by synthesising evidence on BBD in toddlers and menstrual disorders in teenagers through a unified, biopsychosocial, and developmentally attuned framework. By examining common mechanisms, contextual influences, and opportunities for holistic management, the review aims to support clinicians, educators, and policymakers in designing more coordinated, child-centred care pathways.

Ultimately, understanding these conditions not as isolated organ-specific disorders but as expressions of dynamic interactions between physiology, development, behaviour, and environment offers a powerful opportunity to reduce chronicity, improve quality of life, and empower families [7, 23]. This review therefore seeks to articulate a comprehensive, integrative perspective that can inform both clinical practice and future research.

Methods

Study Design

This article is a narrative review designed to synthesise current evidence on Bowel motility and Bladder Disorders (BBD) in early childhood and menstrual disorders in adolescence, with a focus on shared mechanisms, developmental transitions, psychosocial determinants, and holistic management strategies. A narrative review methodology was selected to allow integration of diverse evidence sources across paediatrics, urology, gastroenterology, adolescent gynaecology, developmental psychology, and behavioural science.

Search Strategy

A broad, iterative search strategy was used to capture the

multidisciplinary nature of the topic. Literature searches were conducted across major biomedical and psychological databases, including: MEDLINE/PubMed, EMBASE, CINAHL, PsycINFO, Cochrane Library.

Search terms were combined using Boolean operators and included variations of:

- Bowel motility, functional constipation, stool withholding, pelvic floor dysfunction
- Bladder disorders, urinary incontinence, dysfunctional voiding, BBD
- Dysmenorrhoea, heavy menstrual bleeding, menstrual irregularities, adolescent gynaecology
- Toddlers, children, adolescents, teenagers, puberty
- Biopsychosocial, trauma, neurodevelopmental disorders, school environment, family factors

Reference lists of key articles and relevant guidelines were hand-searched to identify additional sources.

Eligibility Criteria

Inclusion criteria

- Peer-reviewed articles, guidelines, consensus statements, and high-quality reviews
- Studies involving children aged 1-19 years
- Research addressing BBD, functional constipation, urinary symptoms, menstrual disorders, or pelvic floor dysfunction
- Studies examining psychosocial, behavioural, developmental, or environmental determinants
- Articles published in English

Exclusion criteria

- Studies focused exclusively on adults
- Research limited to rare congenital or structural anomalies without relevance to functional disorders
- Case reports unless offering unique developmental or mechanistic insights
- Non-peer-reviewed commentary without empirical or conceptual contribution

Data Extraction and Synthesis

Given the narrative design, data extraction focused on identifying:

- Epidemiological patterns
- Developmental mechanisms
- Shared physiological pathways
- Psychosocial and environmental determinants
- Clinical presentations across age groups
- Evidence-based management strategies
- Gaps in current practice and research

Findings were synthesised thematically, with attention to developmental transitions from toddlerhood to adolescence and the interplay between biological, behavioural, and contextual factors. Emphasis was placed on integrating evidence across traditionally siloed specialties to construct a holistic, biopsychosocial framework.

Patient and Public Involvement

Patients or members of the public were not directly involved in the design, conduct, or reporting of this narrative review. However, the review is informed by existing literature on patient experiences, family perspectives, and adolescent self-reported outcomes.

Results

The search and thematic synthesis identified five major domains relevant to understanding Bowel motility and Bladder Disorders (BBD) in early childhood and menstrual disorders in adolescence: (1) epidemiology and symptom burden; (2) shared physiological mechanisms; (3) developmental transitions; (4) psychosocial and environmental determinants; and (5) evidence-based holistic management strategies. Findings across these domains are summarised below.

Epidemiology and Symptom Burden

Bowel and Bladder Disorders in Early Childhood: Across studies, functional constipation emerged as the most prevalent gastrointestinal condition in toddlers and young children, with estimates ranging from 15-30%. Up to 40% of children with constipation exhibited concurrent urinary symptoms, including urgency, frequency, and daytime wetting. BBD was consistently associated with reduced quality of life, behavioural distress, and increased healthcare utilisation.

Menstrual Disorders in Adolescence: Dysmenorrhoea was reported in 70-90% of adolescents, with 20-30% experiencing symptoms severe enough to impair school attendance or daily functioning. Heavy menstrual bleeding affected approximately one in five adolescents, with iron deficiency common in those with prolonged or heavy flow. Despite high prevalence, many adolescents normalised symptoms or delayed seeking care due to stigma or lack of menstrual literacy.

Shared Physiological Mechanisms

Gut-Bladder Cross-Sensitisation: Multiple studies demonstrated shared neural pathways between the colon and bladder, mediated through sacral spinal circuits. Constipation was shown to increase bladder pressure, reduce functional capacity, and trigger urgency or incontinence. Conversely, bladder dysfunction could exacerbate pelvic floor overactivity, contributing to stool retention.

Autonomic Nervous System Dysregulation: Evidence highlighted the role of sympathetic overactivation and parasympathetic under-regulation in both BBD and menstrual pain. Stress, anxiety, and sleep disruption were consistently associated with worsened gastrointestinal motility, bladder instability, and heightened menstrual pain perception.

Pelvic Floor Dysfunction: Pelvic floor overactivity was identified as a common contributor to constipation, dysfunctional voiding, and dysmenorrhoea. Biofeedback and physiotherapy studies demonstrated improvements across bowel, bladder, and menstrual symptoms, supporting a shared muscular mechanism.

Central Sensitisation: Adolescents with severe dysmenorrhoea or chronic constipation showed features of central sensitisation, including heightened pain responses and symptom amplification.

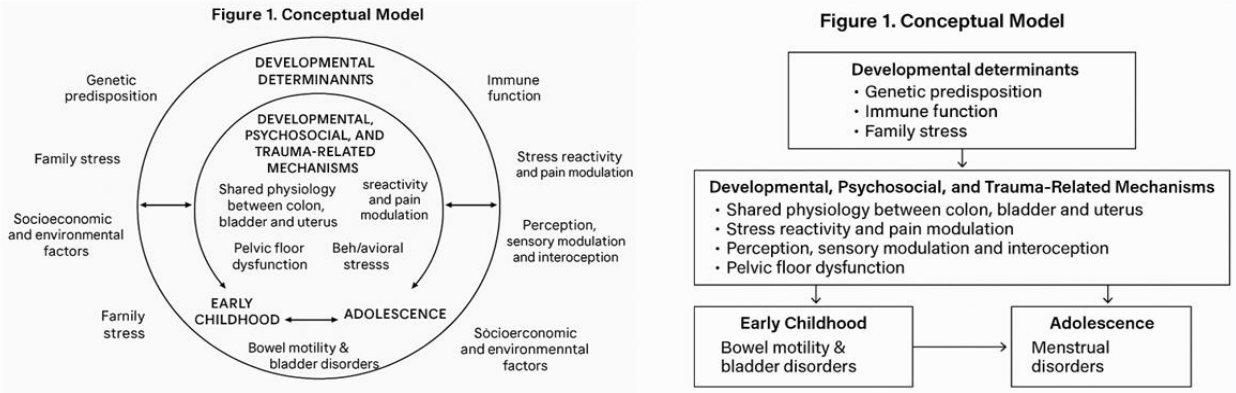

Figure 1: Conceptual model linking early bowel/bladder disorders with adolescent menstrual health.

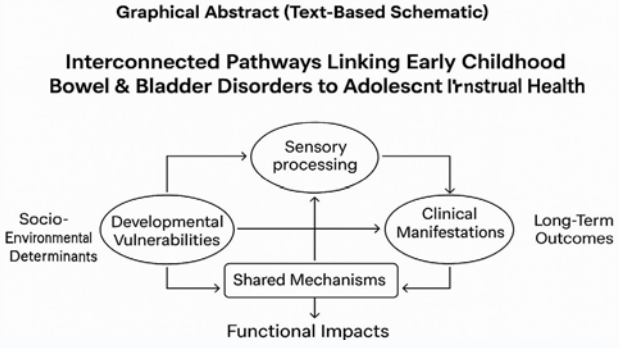

Figure 2: Linear graphical abstract summarising developmental and biopsychosocial pathways.

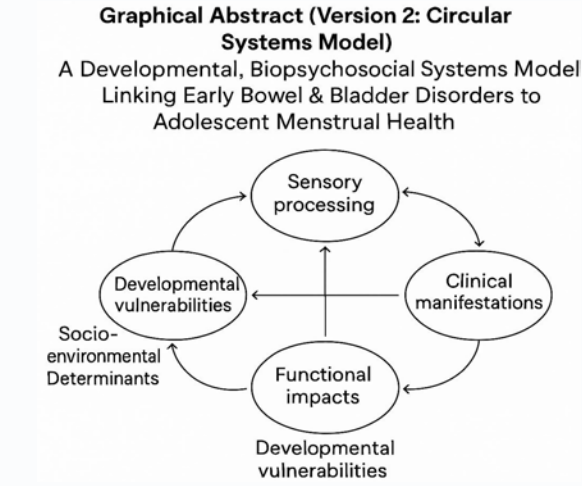

Figure 3: Circular systems graphical abstract showing interconnected determinants and feedback loops.

Early painful experiences - such as painful defecation in toddlers - were associated with increased vulnerability to later pelvic pain.

Developmental Transitions

Early Childhood: Studies emphasised the interplay between immature neuromuscular control, behavioural avoidance, and toilet-training dynamics. Painful defecation often initiated a cycle of withholding, stool retention, and urinary symptoms. Family routines and parental responses strongly influenced symptom persistence.

School-Age Children: School environments emerged as a major determinant of symptom patterns. Avoidance of school toilets, restrictive toilet policies, and embarrassment contributed to withholding behaviours. Children with neurodevelopmental conditions showed higher rates of BBD due to sensory sensitivities and executive-function challenges.

Adolescence: Pubertal hormonal changes introduced new symptom clusters, including dysmenorrhoea, heavy bleeding, and cyclical bowel changes. Adolescents reported increased stress, sleep disruption, and body image concerns, all of which influenced symptom severity. Menstrual stigma and limited menstrual education contributed to delayed help-seeking.

Psychosocial and Environmental Determinants

Family Dynamics: Parental stress, inconsistent routines, punitive toilet-training approaches, and limited understanding of menstrual physiology were associated with poorer outcomes. Supportive, structured routines were protective across age groups.

School Environment: Lack of clean, private toilets and restrictive policies were consistently linked to withholding behaviours and menstrual distress. Adolescents reported difficulty accessing menstrual products or managing symptoms discreetly at school.

Trauma and Adverse Childhood Experiences: Children with histories of trauma showed higher rates of chronic constipation, urinary symptoms, and menstrual pain. Trauma-informed approaches were associated with improved engagement and symptom management.

Neurodevelopmental and Mental Health Conditions: ADHD, autism, anxiety, and sensory processing differences were strongly associated with BBD and menstrual self-management challenges. Studies highlighted the need for tailored interventions for neurodivergent children.

Holistic Management Strategies

Behavioural Interventions: Scheduled toileting, positive reinforcement, and routine-building were effective for BBD in younger children. Adolescents benefited from structured menstrual education and self-management coaching.

Nutritional and Lifestyle Approaches: Adequate fibre intake, hydration, physical activity, and sleep optimisation improved bowel

motility and menstrual symptoms. Selective eating patterns in neurodivergent children required tailored strategies.

Pelvic Floor Physiotherapy: Biofeedback and physiotherapy demonstrated improvements in constipation, dysfunctional voiding, and dysmenorrhoea, supporting the role of pelvic floor mechanisms across conditions.

Pharmacological Support: Osmotic laxatives were effective for constipation, while anticholinergics were used selectively for overactive bladder. NSAIDs and hormonal therapies were effective for dysmenorrhoea and heavy menstrual bleeding.

Integrated Care Models: Studies emphasised the benefits of coordinated care involving paediatrics, urology, gastroenterology, physiotherapy, psychology, and adolescent gynaecology. Integrated pathways reduced fragmentation, improved adherence, and enhanced family satisfaction.

Discussion

This narrative review highlights the substantial burden of Bowel motility and Bladder Disorders (BBD) in early childhood and menstrual disorders in adolescence, underscoring their shared mechanisms, developmental vulnerabilities, and psychosocial determinants [1-4]. Although traditionally managed within separate clinical specialties, the evidence demonstrates that these conditions are interconnected through overlapping neural pathways, pelvic floor dynamics, autonomic regulation, and contextual influences [5-7]. Understanding these disorders through a unified, developmentally attuned framework offers opportunities to improve early recognition, reduce chronicity, and enhance quality of life for children, adolescents, and their families.

Interconnected Mechanisms Across Developmental Stages

A central finding of this review is the convergence of physiological mechanisms underpinning BBD and menstrual disorders. Gut–bladder cross-sensitisation, pelvic floor overactivity, and autonomic dysregulation emerged consistently across studies [5, 6, 8]. These shared pathways help explain why toddlers with constipation often present with urinary symptoms [1, 11], and why adolescents with dysmenorrhoea frequently report bowel or bladder discomfort [3, 4]. The presence of central sensitisation in some adolescents suggests that early painful experiences - such as painful defecation during toilet training - may prime the nervous system for heightened pain responses later in life [6, 18]. This developmental continuity reinforces the need for early, supportive interventions that prevent cycles of pain, avoidance, and sensitisation.

The Role of Developmental Transitions

The review highlights how developmental transitions shape symptom expression and management needs. In toddlers, immature neuromuscular control, behavioural avoidance, and the relational dynamics of toilet training create vulnerability to BBD [11-14]. In adolescence, hormonal fluctuations, sleep disruption, and psychosocial pressures contribute to menstrual disorders and amplify pre-existing sensitivities [3, 16, 17]. These findings emphasise that symptoms cannot be understood in isolation from developmental context. Clinicians must consider the child's stage of neurobiological maturation, emotional development, and social environment when assessing and managing symptoms.

Psychosocial and Environmental Determinants

Across age groups, psychosocial and environmental factors emerged as powerful determinants of symptom persistence. Family routines, parental stress, and punitive toilet-training approaches were associated with poorer outcomes in younger children [14, 15]. School environments - particularly limited toilet access, lack of privacy, and menstrual stigma - were consistently linked to withholding behaviours and menstrual distress [13, 14]. Trauma and adverse childhood experiences were associated with chronic pain, constipation, and menstrual disorders [9, 20]. Neurodevelopmental conditions such as ADHD and autism further complicated toileting and menstrual self-management, underscoring the importance of tailored, sensory-aware interventions [11, 12, 21].

These findings reinforce the inadequacy of purely biomedical approaches. Effective management requires attention to the relational, behavioural, and environmental contexts in which symptoms arise.

Implications for Clinical Practice

The evidence supports a shift toward integrated, holistic care pathways that bridge paediatrics, gastroenterology, urology, physiotherapy, psychology, and adolescent gynaecology [16, 22]. Early, non-medicalised interventions - such as scheduled toileting, pelvic floor physiotherapy, nutritional optimisation, and menstrual education - were consistently effective across studies [7, 11, 17]. Clinicians should adopt a biopsychosocial framework that validates symptoms, addresses contextual contributors, and empowers families and adolescents with practical strategies.

Routine screening for psychosocial stressors, school barriers, and neurodevelopmental needs should be incorporated into assessments for both BBD and menstrual disorders [20-22]. Adolescents, in particular, benefit from menstrual literacy, normalisation of symptoms, and clear guidance on when to seek care [3, 17]. For toddlers, supportive toilet-training approaches and consistent routines are essential [11,14].

Implications for Policy and Service Design

The findings highlight the need for system-level changes, including:

- Improved school toilet access and menstrual-friendly policies [13, 14].
- Integrated care pathways that reduce fragmentation [16, 22].
- Training for clinicians in trauma-informed and developmentally sensitive practice [9, 20].
- Culturally inclusive approaches to toileting and menstrual education [14, 24].

Policy efforts should prioritise equitable access to care, recognising that children from marginalised or socioeconomically disadvantaged backgrounds face disproportionate barriers [24].

Research Implications

Several gaps in the literature were identified. Evidence on menstrual-related symptoms in early puberty remains limited [3, 16], and few studies include neurodivergent children or those facing socioeconomic disadvantage [21, 24]. Longitudinal research is needed to understand how early BBD may influence later menstrual or pelvic pain, and *vice versa* [5, 6]. Co-designed interventions with young people and caregivers are essential to ensure acceptability

and effectiveness. Further research into central sensitisation, gut–bladder–uterine interactions, and the impact of trauma will deepen understanding of these complex conditions [6, 9, 18].

Strengths and Limitations of this Review

This review's strengths include its integrative, developmental perspective and its synthesis of evidence across traditionally siloed specialties. However, as a narrative review, it is subject to selection bias and does not include formal quality appraisal. Heterogeneity in study designs and outcome measures limits comparability, and evidence gaps persist in younger children and marginalised populations.

Our paper offers:

- A unified conceptual model linking early childhood bowel and bladder dysfunction with adolescent menstrual health.
- A comprehensive synthesis of shared physiological, psychological, sensory, and environmental mechanisms.
- A practical, integrated care pathway spanning primary care, specialist services, schools, and families.
- Trauma-informed, neurodiversity-affirming, and equity-focused strategies applicable across clinical settings.
- Policy, research, and quality-improvement recommendations to support system-level change.
- Twenty-four tables and two graphical abstracts providing clinicians, educators, and policymakers with actionable tools.

Summary

Bowel and Bladder Disorders (BBD) are a spectrum of conditions affecting individuals across their lifespan, broadly classified as functional (most common in children/adolescents, often linked to behavior) or neurogenic (due to nerve damage in conditions like spinal cord injury or multiple sclerosis). A holistic approach integrating various therapeutic modalities is essential for effective diagnosis and management.

Definition and Classification

Bladder and bowel dysfunction (BBD) refers to a range of Lower Urinary Tract Symptoms (LUTS) like urgency, frequency, incontinence, and hesitancy, coupled with fecal elimination issues, primarily constipation and/or fecal incontinence (encopresis) (Table 1).

Causes and Pathophysiology

Causes vary with age and type:

- **Functional:** The exact mechanism is often elusive, but stress can play a role via the brain-gut axis and corticotropin-releasing factor pathways. In children, the most common cause is chronic constipation, where a loaded rectum presses on the bladder, leading to dysfunction and even recurrent Urinary Tract Infections (UTIs) and potential kidney damage.
- **Neurogenic:** The pathophysiology depends on the lesion's location. Upper motor neuron injury leads to reflex (spastic) bowel/bladder with increased tone and retention, while lower motor neuron damage results in flaccid bowel/bladder with loss of peristalsis and sphincter tone, leading to both constipation and incontinence.

Clinical Features

Symptoms include urinary and fecal incontinence, frequency, urgency, hesitancy, straining, abdominal pain, and stool withholding behaviors. "Red flags" like excessive thirst, specific cutaneous spinal signs (e.g., hair tuft, dimple), or specific anatomical abnormalities may indicate organic causes.

Investigations and Diagnosis

Diagnosis is essentially clinical and involves a thorough history and physical examination, including neurological assessment. Key diagnostic tools include:

- Bladder/Bowel Diaries: 48-hour frequency volume charts and 7-day bowel diaries help track habits and symptoms.
- Validated Questionnaires: Tools like the Dysfunctional Voiding Symptom Score (DVSS) or Rome IV criteria are used for assessment.
- Non-invasive Imaging: Uroflowmetry, Post-Void Residual (PVR) urine measurement via ultrasound, and kidney imaging are standard.
- Invasive Studies: Urodynamics or digital rectal examinations are reserved for complex cases or specific indications to assess bladder and sphincter function.

Prevention and Management (Holistic Approach)

Management follows a stepwise "pyramid" approach, starting with conservative, holistic strategies:

1. Standard Urotherapy/Lifestyle Modification (First-Line): Education on normal function, adequate fluid intake, regular voiding patterns, healthy diet (high fiber), and consistent treatment of constipation are foundational for all age groups. Treating the bowel dysfunction before the bladder dysfunction is a common and effective empirical approach in children.

2. Physical/Behavioral Therapies:

Pelvic Floor Muscle Training (PFMT): Essential for improving muscle control and coordination.

Biofeedback: Uses visual or auditory feedback to teach correct muscle use, highly effective for dyssynergic defecation and urinary incontinence.

Movement & Mind-Body Therapies: Diaphragmatic breathing, relaxation techniques, and mind-body awareness are vital for long-term improvement by addressing the psychosocial aspects and fostering patient empowerment. The involvement of psychologists may be necessary for associated behavioral disorders.

3. Pharmacological Treatment: Medications like polyethylene

Table 1:

Classification	Description	Typical Age Group
Functional (Idiopathic)	No underlying organic or neurological cause is found. Often related to poor habits (voiding postponement) or constipation.	Primarily children and adolescents; adults with chronic functional issues.
Neurogenic	Caused by damage or disease of the nervous system, leading to loss of sensory/motor control.	All ages, common in adults with MS, stroke, diabetes, or children with spina bifida.

glycol (for constipation), anticholinergics (for overactive bladder), or specific laxatives are used if first-line therapies fail.

4. Minimally Invasive/Surgical Interventions: For refractory cases, options include Transcutaneous/Percutaneous electrical Nerve Stimulation (PTNS, TNS), Sacral Neuromodulation (SNS), or Antegrade Continence Enemas (MACE/ACE). Colostomy is a last resort option.

Key Dietary Protocols

1. Fluid Intake

Adequate hydration is crucial for both bladder and bowel health. It helps keep stools soft and easy to pass, ensuring proper bowel motility, and maintains healthy urine concentration to prevent irritation.

- **General Guideline:** Aim for at least 6 to 8 cups (1.5-2 litres) of non-caffeinated fluids per day for adults, primarily water. Children need proportional amounts based on age and weight.
- **Best Fluid Choice:** Water is the preferred beverage. Herbal teas and diluted fruit juices are also good options.
- **Urine Color Check:** Pale yellow urine generally indicates adequate hydration.

2. Fiber Intake

A diet rich in diverse fiber sources (both soluble and insoluble) helps prevent constipation by adding bulk to stools and making them softer.

- **Daily Target:** Adults should aim for around 30g of fiber per day, while children's needs are lower (e.g., age in years + 5g or 14g per 1000 kcal consumed).
- **Fiber Sources:**

Soluble Fiber (softens stool): Oats, barley, fruits (apples, pears, prunes, kiwis, berries), and pulses (beans, lentils).

Insoluble Fiber (adds bulk): Whole grains (brown rice, wholemeal bread), and fruit/vegetable skins.

- **Implementation Note:** Increase fiber intake gradually to avoid bloating and gas. It must be accompanied by increased fluid intake to be effective.
- **Specific Foods:** Eating two kiwi fruits daily or a few prunes can have a natural laxative effect.

3. Identifying Irritants and Triggers

Certain foods and drinks can irritate the bladder lining or act as stimulants, exacerbating symptoms of Overactive Bladder (OAB) and Irritable Bowel Syndrome (IBS). Keeping a food and symptom diary can help identify personal triggers.

- **Common Bladder/Bowel Irritants to Limit:**

Caffeine: Found in coffee, tea, chocolate, and some sodas, it is a diuretic and stimulant.

Alcohol: Acts as a diuretic and interferes with brain-bladder signals.

Carbonated Drinks: The fizz/carbonation can irritate the bladder.

Acidic Foods/Drinks: Citrus fruits/juices, tomatoes, and vinegar can make urine more acidic and irritating.

Spicy Foods: Can irritate the bowel lining and bladder.

Artificial Sweeteners & Excess Sugar: May increase bladder urgency and frequency.

Dairy (if intolerant): Can cause gas, cramping, or diarrhea in lactose-intolerant individuals.

4. Eating Habits

- Regular Meals: Establish a regular meal pattern; do not skip meals.
- Smaller Meals: Eating smaller, more frequent meals can be easier to digest for those with sensitive bowels.
- Processed Foods: Minimizing intake of ultra-processed foods, which often contain irritants and low fiber, is recommended for overall gut health.

5. Holobiotics refers to the holistic view of the host organism and its entire community of microorganisms (microbiome) as a single biological unit. Within this framework, specific components are used to modulate this system:

Probiotics: These are live microorganisms that, when administered in adequate amounts, confer a health benefit on the host. They include specific strains of Lactobacillus and Bifidobacterium, among others.

Prebiotics: These are non-digestible substrates (typically high-fiber nutrients found in foods like bananas, garlic, and asparagus) that are selectively utilized by beneficial host microorganisms to promote their growth and activity.

Postbiotics: These are preparations of inanimate microorganisms and/or their components or the beneficial metabolic byproducts (e.g., short-chain fatty acids like butyrate) produced during fermentation by probiotics. They offer health benefits without containing live cultures.

Conclusion

BBD in early childhood and menstrual disorders in adolescence are interconnected conditions shaped by shared physiological mechanisms, developmental transitions, and psychosocial environments. A holistic, biopsychosocial approach - grounded in family partnership, school engagement, and integrated care - offers the best opportunity to reduce chronicity and improve wellbeing. By reframing these conditions not as isolated organ-specific disorders but as expressions of dynamic interactions between biology, behaviour, and environment, clinicians and policymakers can support more effective, compassionate, and developmentally attuned care.

Bowel motility and bladder disorders in early childhood and menstrual disorders in adolescence are highly prevalent, burdensome, and deeply interconnected conditions. Although they are often managed within separate clinical pathways, this review demonstrates that they share common physiological mechanisms - including gut-bladder cross-sensitisation, pelvic floor dysfunction, autonomic dysregulation, and central sensitisation - as well as overlapping psychosocial and environmental determinants. These shared pathways highlight the importance of moving beyond organ-specific frameworks toward a more integrated, developmentally informed understanding of symptoms.

Across developmental stages, children and adolescents experience these conditions within the context of family routines, school environments, cultural norms, and emotional wellbeing. Early painful experiences, toilet-training dynamics, menstrual stigma, neurodevelopmental differences, and trauma all shape symptom trajectories. A holistic, biopsychosocial approach - grounded in supportive communication, routine-building, pelvic floor physiotherapy, nutritional optimisation, menstrual education, and family-centred care - offers the most effective pathway to reducing chronicity and improving quality of life.

Fragmented care remains a major barrier. Coordinated, multidisciplinary pathways that bridge paediatrics, gastroenterology, urology, physiotherapy, psychology, and adolescent gynaecology are essential to address the full complexity of these conditions. Such models not only improve clinical outcomes but also reduce unnecessary investigations, enhance family confidence, and promote self-management skills that carry into adulthood.

Future research should prioritise longitudinal studies, co-designed interventions, and trauma-informed, culturally sensitive approaches that reflect the lived experiences of children, adolescents, and their caregivers. By reframing BBD and menstrual disorders as interconnected, developmentally shaped conditions, clinicians and policymakers can create more responsive, equitable, and compassionate systems of care.

References

1. Burgers R, Liem O, Canon S. Functional constipation in children: a systematic review. J Pediatr Gastroenterol Nutr. 2012; 54(1): 56-64.
2. Austin PF, Bauer SB, Bower W, Chase J, Franco I, Hoebeke P, et al. The standardization of terminology of lower urinary tract function in children and adolescents: update report from the Standardization Committee of the International Children's Continence Society. J Urol. 2014; 191(6): 1863-1865. doi:10.1016/j.juro.2014.01.110.
3. Armour M, Parry K, Manohar N, Holmes K, Ferfolja T, Curry C, et al. The Prevalence and Academic Impact of Dysmenorrhea in 21,573 Young Women: A Systematic Review and Meta-Analysis. J Womens Health. 2019; 28(8): 1161-1171. doi: 10.1089/jwh.2018.7615.
4. Armour M, Smith CA, Steel K. Dysmenorrhoea and endometriosis in young people: a systematic review. JAMA Pediatr. 2022; 176(3): e214550.
5. Grundy L, Erickson A, Brierley SM. Cross-organ sensitization between the colon and bladder: mechanisms and clinical implications. Nat Rev Urol. 2019; 16: 17-29.
6. Farmer MA, Taylor AM, Bailey AL. Pain across the menstrual cycle: neurobiological mechanisms. Nat Rev Neurosci. 2020; 21: 744-759.
7. van Engelenburg-van Lonkhuyzen ML, Bols EM, Benninga MA, Verwijs WA, de Bie RA. Effectiveness of Pelvic Physiotherapy in Children With Functional Constipation Compared With Standard Medical Care. Gastroenterology. 2017; 152(1): 82-91. doi: 10.1053/j.gastro.2016.09.015.
8. Chase J, Austin P, Hoebeke P, McKenna P. The management of dysfunctional voiding in children: a report from the Standardisation Committee of the International Children's Continence Society. J Urol. 2010; 183(4): 1296-302. doi: 10.1016/j.juro.2009.12.059.
9. Shonkoff JP, Garner AS. The lifelong effects of early childhood adversity and toxic stress. Pediatrics. 2012; 129(1): e232-46.
10. Lumley MA, Cohen JL, Borszcz GS, Cano A, Radcliffe AM, Porter LS, et al. Pain and emotion: a biopsychosocial review of recent research. J Clin Psychol. 2011; 67(9): 942-968. doi: 10.1002/jclp.20816.
11. Schaaf RC, Benevides T, Mailloux Z, Faller P, Hunt J, van Hooydonk E, et al. An Intervention for Sensory Difficulties in Children with Autism: A Randomized Trial. J Autism Dev Disord. 2013; 44: 1493-1506. doi:10.1007/s10803-013-1983-8.
12. Dunn W. The Impact of Sensory Processing Abilities on the Daily Lives of Young Children and Their Families: A Conceptual Model. Inf Young Child. 1997; 9(4): 23-35.
13. Lundblad B, Hellström AL. Perceptions of School Toilets as a Cause for Irregular Toilet Habits among Schoolchildren Aged 6 to 16 Years. J School Health. 2005; 75: 125-128.
14. Sommer M, Caruso BA, Sahin M. A global review of menstrual hygiene management. Reprod Health. 2016; 13: 48.
15. Cousino MK, Hazen RA. Parenting stress among caregivers of children with chronic illness: A Systematic Review. J Pediatr Psychol. 2013; 38(8): 809-828. doi:10.1093/jpepsy/jst049.
16. Wolfe I, Thompson M, Gill P. Integrated care for children. Arch Dis Child. 2016; 101(11): 992-997.
17. Sawyer SM, Azzopardi PS, Wickremarathne D, Patton GC. The age of adolescence. Lancet Child Adolesc Health. 2018; 2(3): 223-228. doi:10.1016/S2352-4642(18)30022-1.
18. White PH, Cooley WC. Supporting the health care transition from adolescence to adulthood in the Medical Home. Pediatrics. 2018; 142(5): e20182587. doi:10.1542/peds.2018-2587.
19. Santos JD, Lopes RI, Koyle MA. Bladder and bowel dysfunction in children: An update on the diagnosis and treatment of a common, but underdiagnosed pediatric problem. Can Urol Assoc J. 2017; 11(1-2Suppl1): S64-S72. doi: 10.5489/cuaj.4411.
20. Wang R, Kanani R, Mistry N, Rickard M, Dos Santos J. Practical tips for paediatricians: Assessment and management of bladder and bowel dysfunction in the office. Paediatr Child Health. 2020; 25(3): 136-138. doi: 10.1093/pch/pxz084.
21. Hounsome N, Roukas C. Cost-effectiveness of sacral nerve stimulation and percutaneous tibial nerve stimulation for faecal incontinence. Therap Adv Gastroenterol. 2018; 11: 1756284818802562. doi: 10.1177/1756284818802562.
22. Mayer R. Neuromodulation—Who, What, When, Where and Why? J Urol. 2010; 183: 17-18.
23. Lee HJ, Jung KW, Myung SJ. Technique of Functional and Motility Test: How to Perform Biofeedback for Constipation and Fecal Incontinence. J Neurogastroenterol Motil. 2013; 19(4): 532-537. doi: 10.5056/jnm.2013.19.4.532.
24. Lv A, Gai T, Zhang S, Feng Q, Li Y. Electrical stimulation plus biofeedback improves urination function, pelvic floor function, and distress after reconstructive surgery: a randomized controlled trial. Int J Colorectal Dis. 2023; 38(1): 226. doi: 10.1007/s00384-023-04513-7.