

Association between Overweight and Obesity and Functional Constipation in Children and Adolescents: Evidence from a Narrative Review

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Abstract

Background: Functional constipation (FC) is marked by infrequent, hard, and painful bowel movements that are difficult to pass. It is a diagnosis of exclusion, not caused by an identifiable anatomical or medical condition. The cycle usually involves voluntary stool retention, which increases water absorption in the colon, producing harder, drier stools that are more painful to eliminate, thereby sustaining the cycle. **Objectives:** The goal of this narrative review is to assess the relation of overweight/obesity and functional constipation (FC) in children and adolescents. **Methods:** A systematic search from 2004 to 2023 included articles on “functional constipation,” “obesity,” and “children” in English in major databases. The inclusion criteria focused on studies that examined the prevalence and association of these conditions in children and adolescents, resulting in only eight eligible articles. These selected studies, including five cross-sectional observational studies, two case-control studies, and one randomized controlled trial, are crucial for evaluating the association between obesity and functional constipation in children. **Results:** This review examines eight studies investigating the relationship between functional constipation and overweight/obesity in children. While six studies found a significant association between the two conditions, two did not confirm this link. Notably, a systematic review highlighted a strong correlation between functional defecation disorders and excess body weight in children. The studies encompassed various designs, including observational and experimental approaches. However, some studies failed to find a significant association between obesity and constipation. Overall, the results highlight the multifactorial nature of these pathologies, which require tailored interventions to address their prevalence and differences between populations. **Conclusions:** The association between childhood obesity and FC is unclear due to conflicting evidence. While some studies show a significant association, others show contradictory results. Limitations such as study design and sample size contribute to this uncertainty. Future research should prioritize longitudinal studies to understand this association in children and adolescents better.

Keyword: Functional Constipation (FC), Overweight, Obesity, Gastrointestinal Disorders, and Relevant.

Introduction

Functional constipation (FC) is a condition characterized by infrequent, hard, and painful bowel movements that are difficult to evacuate.

It is a diagnosis of exclusion, not attributable to an identifiable anatomical or medical condition [1]. In children, FC often stems from behavioral factors, such as social triggers or a history of

Functional constipation (FC) is a condition characterized by infrequent, hard, and painful bowel movements that are difficult to evacuate. It is a diagnosis of exclusion, not attributable to an identifiable anatomical or medical condition [1]. In children, FC often stems from behavioral factors, such as social triggers or a history of painful defecation [2]. The pathological cycle typically involves voluntary stool retention, which increases water absorption in the colon, resulting in harder, drier stools that are more painful to pass, perpetuating the cycle (Figure 1) [3].

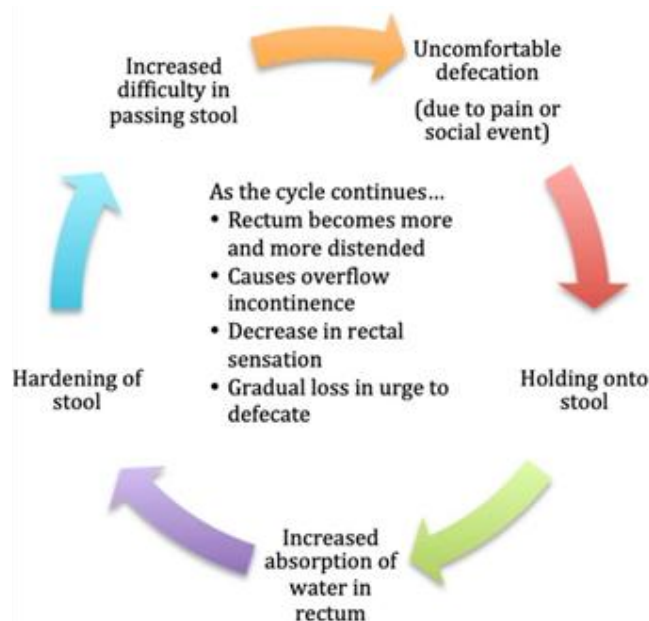


Figure 1: Cycle of Constipation [3].

Clinically, children with constipation may have fewer than three bowel movements per week, pass hard and dry stools, and experience abdominal pain or discomfort during defecation [4]. The ROME IV criteria provide a standardized diagnostic framework that requires the presence of two or more specific symptoms (e.g., infrequent defecation, fecal incontinence, retentive posturing, and painful/hard stools) for at least 1 month [5]. FC is a common pediatric issue with geographically variable prevalence,

ranging from 0.7% to 12% in Europe, 10% to 23% in the Americas, and 0.5% to 29.6% in Asia [6]. The peak onset occurs during toilet training, with a mean age of approximately 2.3 years, and there is no significant gender difference in incidence [7]. While FC occurs across all socioeconomic strata and is not linked to family structure, constipated boys exhibit higher rates of fecal incontinence than girls [3, 8]. The condition imposes a significant burden, driving healthcare costs primarily through outpatient visits and impairing children's quality of life, school performance, and social interactions [9, 10].

Risk factors for persistent FC include family disruption, a positive family history, poor dietary habits, obesity, and a sedentary lifestyle [11]. Obesity, defined as a body mass index (BMI) at or above the 95th percentile for age and sex, is a major global public health concern [12]. In 2020, approximately 39 million children under five were overweight or obese, a number that exceeded 340 million for children and adolescents aged 5–19 in 2016 [13]. Obesity is a key risk factor for numerous chronic health problems, including gastrointestinal disorders like constipation [14]. The objective of this narrative review is to assess and synthesize evidence on the prevalence of functional constipation and overweight/obesity in children and adolescents, with a primary focus on examining the potential relationship and association between these two conditions.

Methods

For this narrative review, a systematic search was conducted across PubMed, Web of Science, and Google Scholar for literature published between 2004 and 2023. Keywords included "functional constipation," "obesity," "children," "association," and "prevalence." The search was limited to English-language publications. Inclusion

ion criteria encompassed studies focusing on children and adolescents that examined the prevalence of FC and obesity or explored their association. Exclusion criteria involved irrelevant topics or populations, non-peer-reviewed or unavailable full-text articles, and studies with significant methodological flaws. The initial search yielded 7,196 articles on childhood constipation and 64,815 on childhood overweight/obesity. Only 710 articles addressed their connection, with 135 focusing on pediatric gastrointestinal dysfunction. After refinement, 47 articles specifically on pediatric FC were identified, of which 8 met the full inclusion criteria (5 observational cross-sectional studies, two case-control studies, and one randomized controlled trial). These eight studies form the basis of this review. Figure 2 illustrates the search strategy.

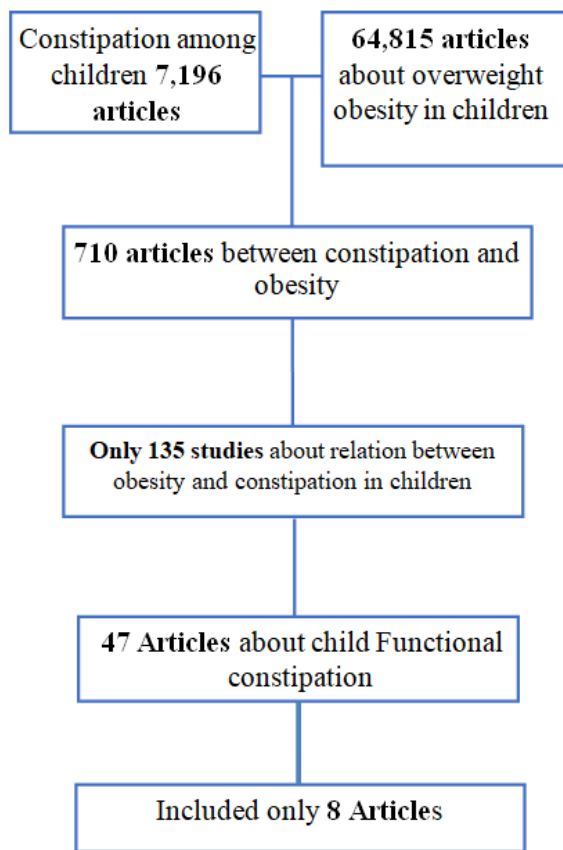


Figure 2: Article search and selection strategy.

Results

The eight articles were included; all were observational studies, and only one was an experimental study. All studied examined the relationship between Functional constipation and Obesity among kids to demonstrate how being overweight in young individuals impacts gastrointestinal dysfunction, particularly functional constipation. Also, those articles show the vast prevalence of constipation and obesity. Also, 6 of them show a significant relationship, while 2 show no or only a weak association. According to a Systematic review from the Department of Pediatric Gastroenterology, Hepatology, and Nutrition, Nationwide Children’s Hospital, Columbus, showed a strong association between Functional Defecation Disorders and Excessive Body Weight among children, that reviewed eight articles, and this article aimed to evaluate this relation [15]. The initial study, published in the Scandinavian Journal of Gastroenterology, constitutes a cross-sectional investigation involving 386 adolescents. Across the entire sample, the prevalence of constipation was 24.9% (96 out of 386 adolescents). Among these 96 individuals with constipation, 7 (7.3%) reported experiencing frequent abdominal pain that alleviated after bowel movements. Additionally, six adolescents (1.6%) exhibited fecal incontinence, defined as experiencing one or more episodes per week. Notably, all six participants with fecal incontinence met the Rome III criteria for functional constipation. Among the male adolescents with fecal incontinence, two were found to be obese. Although the number of participants with fecal incontinence was limited, a statistically significant association between incontinence and obesity was observed among male adolescents. Specifically, among the five male participants with fecal incontinence, two

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were obese, compared to eight obese males out of 181 male participants without incontinence ($P= 0.013$; Chi-square test) [16]. The second article, published in the International Journal of Obesity, focuses on the assessment of functional gastrointestinal disorders (FGID) in obese and overweight children. The study included 475 children aged 4 to 18. The overall prevalence of irritable bowel syndrome (IBS) and functional constipation (FC) in the entire study population was 11% and 18%, respectively. The study compared the incidence of CF and irritable bowel syndrome in a group of obese/overweight children and in a group of children with normal body weight. Irritable bowel syndrome and CF have been shown to occur significantly more frequently in obese and Overweight children than in children of normal weight. Specifically, the results showed that almost half of the obese/overweight children studied suffered from at least one functional gastrointestinal disorder [17]. The third study, conducted as a Case-Control Study, involved the enrollment of 103 cases and 115 controls. No significant differences in age and sex were observed between the two groups. The study found that functional gastrointestinal disorders (FGIDs) were notably more prevalent in obese/overweight children compared to those with normal weight (47.57% vs. 17.39%; $P<0.0001$). In particular, a higher incidence of functional constipation was observed (18.44% vs. 7.4%).001) and irritable bowel syndrome (10.67% vs. 2.60%; $P = 0.024$). However, no difference was observed in functional abdominal pain (1.94% vs. 2.60%; $p = 1.00$). Overall, the data from this study suggest a correlation between excess body fat and FGIDs in children [18]. The fourth study, published in the American Academy of Pediatrics' official journal, examines the prevalence of obesity in kids with functional constipation using a case-control methodology. Seven hundred nineteen

children between the ages of 4 and 18 who were examined in pediatric gastroenterology and general pediatric clinics and were all diagnosed with chronic functional constipation were the subjects of a retrospective chart review. The findings showed that children who were constipated had a significantly greater prevalence of obesity (22.4%) than children who were not (11.7%), with a similar tendency for severe obesity. Obesity was more common in constipated males (25%) than in constipated females (19%), and in both groups, it exceeded that in control males (13.5%) and control females (9.8%). The study concludes that, in comparison to age- and gender-matched controls, children who experience constipation had a noticeably higher frequency of obesity [19]. Another paper from The Children's Hospital in Boston, Massachusetts, affiliated with the Division of Gastroenterology and Nutrition, examines a group of 80 kids aged 1 to 18. With a BMI of 33 and an average age of 11 years, 38% of these 80 kids were boys. Age, race, and BMI did not significantly differ between the sexes. Remarkably, 23% of the obese children in the study group had a constipation prevalence rate, and 30% of the children showed signs of soiling or constipation. The research highlights a direct link between childhood obesity and higher rates of constipation and soiling, proposing a variety of multifactorial explanations for constipation in this population, such as food choices, exercise levels, behavioral patterns, and hormonal impacts. Additionally, constipation is not the only reason for the increased frequency of soiling. For a considerable amount of time, pediatric gastroenterologists have conjectured that children who exhibit constipation typically have a higher body mass index (BMI) than the general population [20]. A prospective, randomized, controlled study was conducted by the Department of Pediatric Gastroenterology

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and Nutrition at Emma's Children's Hospital in Amsterdam to assess the frequency of functional constipation in children with morbid obesity according to the Rome III (Diagnostic Criteria for Functional Dyspepsia) criteria. A standardized questionnaire was completed by 91 consecutive children with morbid obesity between 2004 and 2007 (34% of them were males). With a range of 8 to 18 years old, the children's median age at intake was 15 years, and all of them had comorbidities and a corrected BMI of more than 35 or 30 kg/m². According to the research, four of the 19 children (or 21%) who satisfied the Rome III criteria for functional constipation had previously started taking laxatives. Seven other youngsters had previously used laxatives even though they did not initially fit the Rome III requirements. A BMI of 35 or higher—adjusted for age and gender—or a BMI of 30 in the event of morbidity attributable to obesity were the inclusion criteria. Psychiatric problems (such as schizophrenia, severe autism, and intellectual disability) and other major medical issues that would make participation in the program impossible were included in the list of exclusion criteria. According to the Rome III criteria, this prospective study reveals a considerable constipation frequency of 21% in children with morbid obesity, which is much higher than the global prevalence of 8.9% in children. As such, the results confirm that children who are obese have a higher incidence of functional constipation [21]. While the two remained, the articles show no effect of obesity on constipation or vice versa, and have not confirmed a link or association between the two conditions. The study utilized a cross-sectional design to examine the prevalence of functional constipation in children and its relationship with dietary habits, overweight status, and physical activity. Conducted among 452 children aged 6–12 years in Osasco, São Paulo, the research

diagnosed functional constipation based on Rome IV criteria, which require persistent clinical symptoms for over two months. The findings revealed a prevalence of 22.3% for functional constipation among the participants. Initial analysis showed a correlation between increased abdominal circumference and functional constipation in girls ($p=0.036$); however, this association did not hold in the logistic regression model. Interestingly, boys with functional constipation showed higher fat intake ($p=0.041$). Nevertheless, no statistically significant relationship was found between functional constipation and overweight status (44.6% and 34.5% of children with and without constipation, respectively; $p=0.083$) or active commuting to school (48.5% and 56.7% of children with and without constipation, respectively; $p=0.179$). Dietary intake was assessed using a 24-hour recall survey, while weight status was determined using various measurements such as weight, height, abdominal circumference, and bioelectrical impedance. Active commuting to school and physical activity levels were evaluated through a validated questionnaire. Overall, the study did not find a significant association between functional constipation, overweight status, and physical activity among the study population. Despite initial indications of potential correlations in specific demographic groups, further analysis did not support these findings. These results underscore the multifactorial nature of functional constipation in children and emphasize the importance of comprehensive approaches in understanding and managing this prevalent condition [22]. The last study examined in this narrative review, published in the *Journal of Pediatrics*, investigated the prevalence of functional constipation, overweight, and obesity among Colombian children using a cross-sectional observational

design. Additionally, the study aimed to explore any potential link between functional constipation and excess body weight in this demographic. Data encompassing demographics, anthropometric measurements, and questionnaire responses were gathered from a cohort of 2820 children aged 8 to 18 across four regions in Colombia. Anthropometric parameters, including weight, height, and body mass index (BMI), were measured according to World Health Organization guidelines. Among the participants, 368 children (13.0%) were identified as having functional constipation, while 542 (19.2%) were categorized as overweight and 188 (6.7%) as obese. Intriguingly, the occurrence of functional constipation was not found to be more prevalent among obese (14.9%) or overweight (13.1%) children compared to those with normal weight (12.9%, $P = .73$). Moreover, the prevalence rates of functional constipation, overweight, and obesity displayed significant variation across different regions of Colombia. Particularly noteworthy was the higher prevalence of functional constipation and excess body weight among children attending private schools compared to those in public schools [23]. In summary, the study underscores the frequent occurrence of functional constipation, overweight, and obesity among Colombian children. However, no substantial association was discerned between functional constipation and overweight or obesity within this population (Table 1).

Discussion

This narrative review synthesizes findings from eight studies investigating the association between functional constipation (FC) and overweight/obesity in children and adolescents. The results present a complex and contradictory picture, reflecting the methodological and demographic heterogeneity inherent in current

research. While a majority of included studies (six of eight) indicate a significant positive association, two well-conducted studies found no statistically significant link, highlighting the need for a nuanced interpretation of the evidence. The findings suggesting an association are compelling. Several studies demonstrate not only a higher prevalence of FC in obese populations but also an increased overall burden of functional gastrointestinal disorders (FGIDs) [17, 18]. For instance, the odds of FC were significantly elevated in obese/overweight children compared to normal-weight controls in multiple settings [18, 19]. This correlation extends to specific complications, such as fecal incontinence, which showed a significant association with obesity in male adolescents in one study [16]. The prospective studies by van der Baan-Slootweg *et al.* provides particularly strong evidence, reporting an FC prevalence of 21% in a cohort with morbid obesity more than double the reported global pediatric prevalence firmly establishing this population as high-risk [21]. These consistent observations across different countries and age groups support the hypothesis that excess adiposity may contribute to gastrointestinal dysmotility through multifactorial pathways, including dietary patterns (e.g., low fiber, high fat), physical inactivity, hormonal influences (e.g., insulin resistance, inflammatory adipokines), and alterations in gut microbiota [20, 24, 25]. However, the contradictory evidence cannot be dismissed. Two robust, large-scale cross-sectional studies one in Brazil ($n=452$) and another in Colombia ($n=2,820$) found no significant association between FC and overweight status after controlling for potential confounders [22, 23]. The Colombian study is especially notable for its size and regional diversity, concluding that FC prevalence was similar across weight categories (obese: 14.9%, overweight: 13.1%, normal weight: 12.9%;

P=.73) [23]. These discrepancies underscore critical limitations in the existing literature. Primarily, the overwhelming reliance on cross-sectional and case-control designs precludes causal inference. It remains unresolved whether obesity predisposes individuals to FC, whether FC (and its management, including sedentary behavior and dietary modifications) contributes to weight gain, or whether both conditions share common underlying etiologies, such as poor nutritional habits, psychosocial stress, or genetic predispositions [26]. Further confounding the relationship is significant methodological heterogeneity. Studies employed different diagnostic criteria (Rome III vs. IV), varying definitions of overweight/obesity (BMI percentiles vs. z-scores), and diverse assessment tools (questionnaires vs. clinical review). Population characteristics also varied widely in terms of age range, cultural context, socioeconomic status, and access to healthcare, all of which are known to influence both bowel habits and nutritional status [27]. The finding by Koppen *et al.* of significant regional variation within Colombia itself suggests that broader environmental and lifestyle factors may modulate any potential biological association [23].

Conclusion

In conclusion, the current body of evidence suggests a plausible epidemiological link between childhood obesity and functional constipation, but this association is neither universal nor clearly causal. The conflicting results indicate that the relationship is likely modulated by a complex interplay of biological, behavioral, and environmental factors that are not fully captured in extant studies.

To advance this field, future research must adopt more rigorous methodologies. First, longitudinal cohort studies are essential for establishing

temporality and exploring potential bidirectional relationships. Second, research should move beyond mere association to investigate underlying pathophysiological mechanisms, such as the role of visceral adipose tissue on colonic transit, gut-brain axis signaling, and the pro-inflammatory state of obesity. Third, there is a need for intervention studies to determine if weight management or specific dietary interventions (e.g., fiber supplementation) are effective in alleviating constipation in obese children. Fourth, analyses should be stratified by potential effect modifiers, including sex, stage of puberty, dietary composition, and physical activity levels, to identify high-risk subgroups. Finally, employing objective measures (e.g., transit time studies, body composition analysis) alongside validated symptom questionnaires will enhance diagnostic precision and reduce reporting bias. Clarifying this relationship has direct clinical implications. If a causal link is established, it would advocate for the integration of nutritional and weight management strategies into the standard care for constipation in obese children. Conversely, if the link is attributable to shared confounders, public health efforts should focus on promoting overall healthy lifestyles to prevent both conditions simultaneously.

Declarations

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Author contributions: MHS and HHR conceptualized and designed the Review. DAS and MOQ performed the literature review and data curation. ZMA drafted the manuscript. MHS and MOQ revised the manuscript. HHR and DAS supervised the review. All authors have read and approved the final manuscript.

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Table 1: Summary of the studies included in the study

Article Title and Reference	Study Design	Age Group	Study Period	Sample Size	Main Finding
[16]	Cross-sectional	14–19 years	2 months	386 adolescents	A significant association was found between constipation and higher BMI, particularly among female adolescents.
[17]	Cross-sectional	4–18 years	Jul 2011 – Dec 2012	475 children	A strong association was observed between obesity/overweight and having at least one FGID, including constipation.
[18]	Case-control	4–18 years	Jan 2016 – Jul 2017	218 (103 cases, 115 controls)	Data suggest a link between excess body weight and gastrointestinal dysfunction, including functional constipation.
[19]	Retrospective case-control	4–17 years	Jul 2002 – Jun 2004	1649 (719 cases, 930 controls)	A higher prevalence of obesity was found in children with constipation, indicating a significant association.
[20]	Cross-sectional	1–18 years	Not specified	80 children	23% of the obese children in the cohort met the criteria for constipation.
[21]	Randomized Controlled Trial	8–18 years	2004–2007	91 children	Confirmed a higher occurrence of functional constipation in children with morbid obesity (21%).
[22]	Cross-sectional	6–12 years	Nov 2014 – 2015	452 children	No significant association was found between functional constipation and overweight status or physical activity.
[23]	Cross-sectional	8–18 years	Feb–Oct 2014	2820 children	No significant association was found between functional constipation and overweight or obesity.