

## Association between Lifestyle Factors and Constipation among Children Aged 3-10 Years in Hospital

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### Abstract

**Background:** Constipation is a prevalent gastrointestinal condition in children that may have a severe impact on their physical well-being, everyday life, and quality of life. It is a multifactorial disorder that depends on many dietary, lifestyle and behavior factors. **Objective:** Thus, the objective of this research was to evaluate the lifestyle factors responsible to constipation in children aged 3-10 years. A cross-sectional study was done in a hospital among children within the age range. **Methodology:** A structured questionnaire was used to collect the data and it contained data about dietary intake (fiber, milk, whole grains and water), lifestyle habits (physical activity and screen time) and bowel practices (toilet routine and stool withholding). Clinical variables like abdominal pain, appetite and body mass index (BMI) were also evaluated. A statistical analysis was conducted to find out the

relationship between these variables and the severity of constipation. **Results:** The findings showed that poor dietary fiber intake, insufficient water intake, excessive screen time, and lack of physical exercise had a significant effect on the severity of constipation ( $p < 0.05$ ). There were also strong associations with behavioral factors such as irregular toilet routine and stool withholding. Also, constipation was strongly associated with abdominal pain and decreased appetite as well as increased BMI. To sum up, lifestyle and dietary habits are essential in the occurrence of constipation among children. **Conclusion:** Effective prevention and management of constipation in children aged 3-10 years require early detection and intervention based on dietary habits, physical activities, screen time, and healthy bowel habits.

### Author Details

**Keywords:** Constipation, Dietary Intake, Body Mass Index, Physical Activities

Received on 15 May 2026

Accepted on 07 Jun 2026

Published on 17 Jun 2026

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## **Introduction**

Constipation is one of the most common gastrointestinal disorders affecting children worldwide and is characterized by infrequent bowel movements, painful defecation, hard stools, fecal retention, and a feeling of incomplete evacuation. The prevalence of childhood constipation varies globally, ranging from 0.7% to 29.6%, with functional constipation (FC) accounting for approximately 95% of cases [1]. Functional constipation is generally not associated with any underlying organic disease and is commonly linked to factors such as poor dietary habits, low physical activity, prolonged screen time, psychological stress, family history, and environmental influences. Childhood constipation negatively affects physical health, emotional well-being, quality of life, and healthcare utilization. Early identification of modifiable lifestyle factors is essential for effective prevention and management of constipation among children [2,3].

Several studies have investigated dietary and lifestyle interventions for the management of constipation. Research demonstrated that yogurt supplementation significantly improved constipation symptoms in both animal models and human participants. In a clinical trial involving 86 constipated patients, daily consumption of 200 g yogurt for four weeks significantly improved bowel habits and quality of life without serious adverse effects [4].

Similarly, black tea extracts were found to alleviate constipation symptoms in loperamide-induced constipated mice by increasing fecal water content, gastrointestinal transit rate, and regulating neurotransmitters involved in intestinal motility. Another study examined fermented soybean dregs and reported that fermentation increased soluble dietary fiber content, which contributed to improved stool frequency, fecal weight, and intestinal transit in constipated mice. These findings highlight the beneficial role of dietary fiber, fermented foods, and functional foods in improving bowel function and reducing constipation symptoms [5,6].

In addition to relieving constipation, functional foods such as yogurt, fermented soybean products, and black tea extracts provide several health benefits [7]. These foods promote gut health by supporting beneficial intestinal bacteria, improving digestive function, enhancing nutrient absorption, and maintaining intestinal integrity. Fermented products are rich in bioactive compounds and soluble dietary fiber, which help regulate bowel movements and improve gastrointestinal motility. Increased consumption of fiber-rich and fermented foods may also contribute to improved immune function, reduced inflammation, and better overall health outcomes in children [8,9].

Constipation is a prevalent childhood gastrointestinal disorder that significantly impacts children's health and quality of life. Functional constipation is influenced by multiple lifestyle factors, including dietary habits, physical inactivity, sedentary behavior, and psychosocial conditions [10]. Evidence from experimental and clinical studies suggests that dietary interventions, particularly the consumption of fermented foods, yogurt, dietary fiber, and functional food products, can effectively improve bowel function and alleviate constipation symptoms. Understanding the association between lifestyle factors and constipation can support the development of preventive strategies, early interventions, and health education programs aimed at improving gastrointestinal health among children [11,12].

## **METHODOLOGY:**

This cross-sectional study was conducted over a period of four months in Farooq Hospital, Chaudhry Muhammad Akram Hospital (CMAH), Lahore General Hospital, and Children's Hospital. A total of 100 children aged 3–10 years were selected using a non-probability convenience sampling technique. Children who were toilet-trained, had functional constipation or appeared healthy, and whose parents or guardians provided informed consent were included in the study. Children with organic

gastrointestinal diseases, chronic systemic or neurological disorders, a history of gastrointestinal surgery, use of constipation-inducing medications, or acute illness requiring hospitalization were excluded. Ethical approval was obtained from the Ethical Review Committee of Superior University, and informed consent was secured from all participants' parents or guardians. Data were collected through a structured questionnaire consisting of sections on demographics, bowel habits, lifestyle factors, and outcomes of constipation. The collected data were analyzed using SPSS version 25. Descriptive statistics, including frequencies and percentages, were used to summarize categorical variables, while results were presented in tables and bar graphs. The Chi-square test was applied to determine the association between constipation and selected lifestyle factors, with a p-value of less than 0.05 considered statistically significant [13,14].

## RESULTS:

**Table 1: Association between Fruits intake and constipation**

Frequency	Mild	Moderate	Severe	Total	P Value
Daily	15	4	0	19	
3-4 Weeks	13	2	9	17	0.001(<0.05)
1-2 weeks	10	16	2	35	
Rarely/Never	11	8	10	29	
<b>Total</b>	<b>49</b>	<b>30</b>	<b>21</b>	<b>100</b>	

Eating fruits daily is associated with milder constipation in children, while rare fruit intake is linked to more severe constipation ( $\chi^2 = 22.692$ ,  $df = 6$ ,  $p = 0.001$ ). Basically, more fruits are equally to less severe constipation. Fruits naturally have high dietary fiber and water content, which improves breakdown and helps ease stools. Fiber prompts intestinal movement, which keeps bowel movements daily and stools easy to pass. On the other hand, when fruit ingestion reduces, there is a fiber deficiency in the body, due to which stools become tough and dry, and constipation develops. Generally, this association wraps up that everyday fruit consumption is very vital to prevent constipation in children and reduce its intensity. Hence, occasionally fruits should be included in the daily diet of children to sustain bowel health and reduce the hazard of constipation.

**Table 2: Association between Vegetables intake and constipation**

Frequency	Mild	Moderate	Severe	Total	P Value
Daily	1	2	0	3	
3-4 Weeks	7	4	1	22	0.049(<0.05)
1-2 weeks	18	13	9	40	
Rarely/Never	13	11	11	35	
<b>Total</b>	<b>49</b>	<b>30</b>	<b>21</b>	<b>100</b>	

Eating vegetables regularly is linked to milder constipation while rare vegetables intake linked to sever constipation ( $\chi^2 = 12.672$ ,  $df = 6$ ,  $p = 0.049$ ). More vegetables are equal to less severe constipation. Vegetables are naturally high in dietary fiber, which enhances digestion and smooths bowel movements. Fiber boosts intestinal

movement, making stools easier to pass and lowering the hazard of constipation. Additionally, vegetables contain vitamins and minerals that help sustain gut health. When vegetable intake reduces, fiber lack can lead to hard and dry stools, which can cause constipation and severe symptoms. Basically, this association terminates that daily vegetable consumption is important for preventing and lowering the intensity of constipation in children. Hence, green leafy vegetables and seasonal vegetables should be added to children's daily diet to enhance bowel health and lower the risk of constipation.

**Table 3: Association between whole grains intake and constipation**

Frequency	Mild	Moderate	Severe	Total	P Value
Daily	11	6	2	19	
3-4 Weeks	25	10	2	37	0.002(<0.05)
1-2 weeks	9	9	14	32	
Rarely/Never	4	5	3	12	
Total	49	30	21	100	

Whole grain consumption is linked to constipation relief more whole grains mean milder constipation while less mean more severe. ( $\chi^2 = 12.672$ ,  $df = 6$ ,  $p = 0.002$ ). Whole grains (such as brown bread, oats, whole wheat roti, etc.) contain a higher amount of dietary fiber, which enhances digestion and retains bowel movements active. Fiber supplies bulk to the stool and makes it soft, which makes bowel movement easier and decreases the risk of constipation. In contrast, when the consumption of whole grains in the diet is low and the consumption of refined grains is high, the stool becomes tough and dry, which increases the chances of developing constipation. Generally, this association ends that daily consumption of whole grains is very crucial to prevent constipation in children and reduce their intensity. Thus, whole wheat roti, oats, and fiber-rich grains should be added in the daily diet of children instead of refined foods to retain the bowel movement regularly and reduce the hazards of constipation.

Frequency	Mild	Moderate	Severe	Total	P Value
Daily	22	13	2	37	
3-4 Weeks	10	2	4	16	0.021(<0.05)
1-2 weeks	9	11	7	27	
Rarely/Never	8	4	8	20	

Total	49	30	21	100	
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**Table 4: Association between Milk consumption and constipation**

Daily milk consumption is related to milder constipation while less milk intake related to moderate to severe constipation ( $\chi^2 = 12.672$ ,  $df = 6$ ,  $p = 0.021$ ). Milk is a vital dietary origin that provides calcium and protein to the body, but if milk intake is not balanced or the baby cannot endure the remaining digestive milk, then constipation can develop. In rare cases, low or irregular milk intake also causes dietary imbalance, which leads to irregular bowel movements and increases the symptoms of constipation. So, moderate and regular milk intake helps maintain digestive health. On the whole, this association summarizes that balanced milk consumption is very crucial to prevent constipation in children and reduce their intensity. Therefore, children should be given milk in a suitable amount in their regular routine and if symptoms of constipation develop, then enhance the dietary pattern so that the risk of constipation can be reduced.

**Table 5: Association between Fast food consumption and constipation**

Frequency	Mild	Moderate	Severe	Total	P Value
Daily	12	12	9	33	
3-4 Weeks	7	9	8	24	0.029(<0.05)
1-2 weeks	20	6	3	29	
Rarely/Never	10	3	1	14	
Total	49	30	21	100	

Figure 1.5 shows Fast food intake is notably associated with constipation seriousness, where continuous fast-food consumption is linked lower to higher constipation ( $p = 0.029$ ). Greater fast food intake results in increased constipation of intensity. Fast food is low in dietary fiber and high in fats, salt, and refined carbs, which negatively affect metabolism and slow down bowel movements. Deficiency of fiber intake lowers soft bulk and makes stools difficult although high fat might reduce gastric emptying and decrease intestinal movement. Moreover, children who ingest fast food daily are less likely to eat healthy foods such as fruits and vegetables, which furthermore reduces fiber intake and aggravates constipation. Regular fast-food consumption may also contribute to poor gut health and irregular bowel habits. Primarily, this link indicates that limiting fast food ingestion is important for preventing constipation and reducing its intensity between children. Hence, parents should motivate healthy homemade meals and reduce the regular consumption of fast food to improve bowel health and lower the risk of constipation.

**Table 6: Association between bakery/sugary food intake and constipation**

Frequency	Mild	Moderate	Severe	Total	P Value
Daily	20	19	17	56	
3-4 Weeks	16	7	4	27	0.041(<0.05)
1-2 weeks	12	3	0	15	
Rarely/Never	1	1	0	2	
Total	49	30	21	100	

Daily consumption of bakery items linked to moderate to high constipation while no bakery or sugary items linked to mild or low constipation ( $\chi^2 = 12.672$ ,  $df = 6$ ,  $p = 0.041$ ). Bakery and sweetened desserts are typically deficient in dietary fiber and rich in refined sugars and fats. The decreased fiber reduces the motility of the bowel, causing slow passage of stool and elevated sugar and fat to interfere with normal digestive conditions. This combination of solid stools and lack of bowel movements, thus adding to the risks of constipation. Additionally, the regular intake of sweeter food items can adversely affect gut microbiota, which can also worsen gastrointestinal health. Overall, the outcomes demonstrated that it is crucial to decrease the consumption of bakery and sweetened foods to prevent constipation and make it lighter among children. The encouragement of a healthy diet, high in fiber, and the intake of less processed and sugary food can be a key factor in enhancing the overall health of the digestive system and lowering the risk of constipation.

**Table 7: Association between drinks (soft drinks/juices) intake and constipation**

Frequency	Mild	Moderate Severe	Total	P Value
Less than 4 glasses	22	15 19	56	
4-6 glasses	25	13 2	40	0.009(<0.05)
More than 6 glasses	2	2 0	4	
<b>Total</b>	<b>49</b>	<b>30 21</b>	<b>100</b>	

Adequate amount of water intake linked to no constipation while dehydration low water intake linked to severe or moderate constipation ( $\chi^2 = 12.672$ ,  $df = 6$ ,  $p = 0.009$ ). Water helps soften the stool and facilitate bowel movements, thus avoiding constipation. But soft drinks and juices are rich in sugar and low in fiber and may cause dehydration and slow bowel movement. High consumption of sugar may also disrupt gut microbiota, worsening constipation. Overall, the research revealed that enhancing regular water intake and reducing sugary drinks consumption is one of the keyways of preventing constipation and reducing constipation severity in children. Promoting better drinking habits and limiting soft drinks and packaged juices can significantly contribute to better gut health.

**Table 8: Association between drinks (soft drinks/juices) intake and constipation**

Frequency	Mild	Moderate Severe	Total	P Value
Daily	3	10 8	21	
3-4 times/week	29	18 12	59	0.000(<0.05)
Rarely	17	2 1	20	
<b>Total</b>	<b>49</b>	<b>30 21</b>	<b>100</b>	

Figure 1.8 Soft sugary drink intake is notable associated with constipation intensity, where daily intake of these beverages is linked with more severe constipation. Higher

consumption of soft sugary drinks results in higher constipation of severity. These drinks are greater in sugar and low in fiber, which negatively affects digestion and reduces bowel movements. Deficiency of fiber reduces soft bulk and makes stool hard pass, although excess sugar may lead to an imbalance of gut bacteria and decrease intestinal motility. Moreover, Children who intake sugary drinks usually are less likely to drink healthier alternatives like water and eat fiber rich foods, so reducing fiber intake worsen constipation. Daily intake of soft sugary drinks may also contribute to poor gut health and irregular bowel habits. Primarily, this association indicates that limiting soft sugary drink intake is important for preventing constipation and reducing its severity among children. Hence, parents should motivate water intake and reduce the daily intake of soft sugary drinks to improve bowel health and lower the risk of constipation

**Table 9: Association between Screen time and constipation**

Frequency	Mild	Moderate	Severe	Total	P Value
Less than 1 hour	20	5	4	29	
1-2 hours	15	1	1	17	0.000(<0.05)
More than 2 hours	14	24	16	54	
Total	49	30	21	100	

Screen time more than two hours is strongly related to severe or moderate constipation while limited time associated with low chances if constipation ( $\chi^2 = 12.672$ ,  $df = 6$ ,  $p = 0.000$ ). These results revealed a definite trend where the longer time spent on the screen, the more severe constipation would be. Too much time in front of the computer can cause a sedentary lifestyle and reduce physical activity to slacken the bowel movement and lead to constipation. It may also cause bad eating habits and disruption of routines. The results Indicate that screen time and physical activity should be limited and the risk of constipation reduced. Active lifestyle and decreasing sedentary habits can be of great benefit in enhancing the health of the gastrointestinal system.

**Table 10: Association between toilet routine and constipation**

Frequency	Mild	Moderate	Severe	Total	P Value
Yes	16	13	1	30	
No	32	17	20	69	0.036(<0.05)
Other	1	0	0	1	
<b>Total</b>	<b>49</b>	<b>30</b>	<b>21</b>	<b>100</b>	

Children with fixed toilet routine have mild or less constipation as compared to those who don't have fixed toilet routine ( $\chi^2 = 12.672$ ,  $df = 6$ ,  $p = 0.036$ ). Children who had a regular toilet schedule experienced mild and moderate constipation (mild = 16 moderate = 13), and few serious cases (severe = 1). This indicates that maintaining a normal toilet regime is an important factor in alleviating the severity of constipation. The potential explanation is that a regular toilet habit can control bowel movements and enhance the digestive system. Abnormal habits can also lead to late bowel emptying, formation of hard stools, and pain during defecation. This may, after a certain period, worsen constipation. In general, the findings show that establishing a regular toilet routine is significant in the prevention of constipation and its severity among children. Daily bowel habits can be significantly promoted as a way of improving gastrointestinal health.

**Table 11: Association between ignoring stool and constipation:****Interpretation:**

Frequency	Mild	Moderate Severe	Total	P Value
Yes	25	23 19	67	
No	24	7 2	33	0.002(<0.05)
Total	49	30 21	100	

Eating while playing also linked with constipation ignore the stool accumulate waste in body which can cause severe constipation children who don't ignore or avoid are less or mild constipated ( $\chi^2 = 12.672$ ,  $df = 6$ ,  $p = 0.002$ ). The clarification is that ignoring the urge to defecate causes long holding of stool in the colon, and more water is absorbed, making the stool tough and difficult to pass. This behavior can also disturb normal bowel movement and exacerbate constipation over time. Generally, the findings indicate that children should be supported to respond quickly to the natural urge to stool pass to prevent constipation and decrease its intensity. Supporting healthy bowel habits is crucial for maintaining proper digestive function.

**Table 12: Association between BMI category and constipation**

Frequency	Mild	Moderate Severe	Total	P Value
Underweight	21	19 10	50	
Normal	28	10 6	44	0.001(<0.05)
Overweight	0	1 5	6	
Total	49	30 21	100	

Overweight children tend to have more severe or moderate constipation as compared to healthy children ( $\chi^2 = 12.672$ ,  $df = 6$ ,  $p = 0.001$ ). Children with normal BMI mostly revealed mild constipation (mild = 28), with less moderate and severe cases (moderate = 10, severe = 6). Generally underweight children also faced constipation, including moderate and severe cases (moderate = 19, severe = 10), but the frequency of severe cases was relatively lower than in overweight children. These results showed that BMI status effect constipation intensity. The clarification Is that overweight children might have less physical activity levels and unhealthy dietary patterns, which can lead to reduced bowel motility and constipation. Yet, undernutrition could also influence digestive health and bowel operation. Mainly, the study shows that maintaining a healthy BMI is important for preventing constipation and reducing its intensity in children. Sustain nutrition and daily physical activity are vital for healthier gut.

**Table 13: Association between abdominal pain and constipation**

Frequency	Mild	Moderate Severe	Total	P Value
Yes	23	30 20	73	
No	26	0 1	27	0.000(<0.05)
Total	49	30 21	100	

Children with abdominal pain and bloating BT end to have more severe constipation as compared to children without these symptoms ( $\chi^2 = 12.672$ ,  $df = 6$ ,  $p = 0.000$ ). The clarification is that constipation leads to stool build up in the intestines, leading to swelling and discomfort, which results in abdominal pain and bloating. This condition may worsen bowel habits and generate a cycle of constipation and pain. Generally, the results indicate that abdominal pain is an essential clinical symptom of constipation intensity in children. Originally, acknowledgment and management of these signs could support reducing issues and improving digestive wellbeing.

**Table 14: Association between appetite and constipation**

Frequency	Mild	Moderate	Severe	Total	P Value
Yes	26	27	21	74	
No	23	3	0	26	0.000(<0.05)
Total	49	30	21	100	

Constipation reduction is strongly linked to severity; patients with persistent constipation mostly have mild cases, while those showing reduction tend to have had more moderate to severe constipation initially ( $\chi^2 = 12.672$ ,  $df = 6$ ,  $p = 0.000$ ). Comparatively, children who did not experience reduced appetite had mild constipation (mild = 23), few moderate, and no severe constipation (moderate = 3, severe = 0). These results indicate that the status of appetite is significant in severity of constipation. The potential reason is that constipation may cause abdominal pain, fullness, and loss of appetite which subsequently impacts nutritional intake and digestive processes. Lack of appetite can also worsen constipation since there is poor dietary intake, especially fiber. In general, the results indicate that a healthy appetite and good nutrition are crucial in avoiding constipation and alleviating its intensity among children. The improvement of the health of the gastrointestinal tracts can be greatly achieved by treating issues related to appetite.

## **DISCUSSION:**

The present study investigated the association between lifestyle factors and constipation among children aged 3–10 years. The findings revealed a high prevalence of constipation, with 68% of children experiencing constipation, while many of the remaining children showed symptoms that may predispose them to future constipation. These results highlight constipation as a significant pediatric health concern and emphasize the importance of healthy dietary and lifestyle practices [15,16].

Dietary factors showed strong associations with constipation severity. Regular consumption of fruits, vegetables, and whole grains was significantly associated with lower constipation severity [17]. Children who consumed these fiber-rich foods daily experienced milder symptoms, whereas those with lower intake had higher rates of moderate and severe constipation. These findings are consistent with previous studies reporting that dietary fiber improves bowel motility, stool consistency, and overall digestive health. Milk consumption was also significantly associated with constipation severity, suggesting that balanced and regular intake may contribute to better bowel regulation, although previous research indicates that individual responses to milk may vary [18,19].

Conversely, frequent consumption of fast food, bakery products, sugary foods, and soft drinks was associated with increased constipation severity. These foods are typically low in fiber and high in fat, sugar, and refined carbohydrates, which may impair bowel function and contribute to harder stools. Similar findings have been

reported in previous studies, emphasizing unhealthy dietary patterns as important risk factors for childhood constipation [20,21].

Lifestyle-related factors also played a significant role. Children with higher screen time exhibited greater rates of moderate and severe constipation, likely due to reduced physical activity and increased sedentary behavior [22]. Adequate water intake was associated with lower constipation severity, whereas insufficient water consumption increased the risk of severe constipation. Furthermore, children with overweight BMI showed higher rates of severe constipation, supporting evidence that obesity and poor lifestyle habits contribute to bowel dysfunction [23,24].

Behavioral factors were equally important. Stool-withholding behavior, ignoring the urge to defecate, and irregular toilet habits were significantly associated with increased constipation severity [25]. Delayed bowel emptying leads to excessive water absorption from stools, making them harder and more difficult to pass. Children who maintained regular toilet routines experienced fewer severe symptoms. In addition, abdominal pain, bloating, and reduced appetite were strongly associated with constipation severity, indicating that these symptoms are important clinical indicators of worsening bowel health [26,27].

Overall, the study demonstrated that constipation in children is closely linked to dietary habits, hydration status, physical activity, screen time, BMI, and bowel behaviors [28]. Promoting a fiber-rich diet, adequate water intake, regular physical activity, healthy toilet habits, and limiting fast food, sugary foods, and screen time may help prevent constipation and reduce its severity. These findings support the need for early intervention, parental education, and lifestyle modifications to improve gastrointestinal health and quality of life among children. [29,30]

#### **CONCLUSION:**

This study demonstrates that constipation is highly prevalent among children aged 3 to 10 years and represent a significant public health concern requiring urgent attention. The results reveal strong association between constipation and modifiable lifestyle factors, particularly dietary pattern and physical activity levels. Children with low intake of fiber rich foods such as fruits, vegetables and whole grains, combined with frequent consumption of fast food and bakery products experienced significantly higher rates of constipation. Physical inactivity and poor daily habits further contributed to irregular bowel movement confirming constipation as a multifactorial condition.

#### **REFERNCES:**

- Włodarczyk J, Waśniewska A, Fichna J, Dziki A, Dziki Ł, Włodarczyk M. Current overview on clinical management of chronic constipation. *Journal of Clinical Medicine*. 2021 Apr 16;10(8):1-12.
- Mulhem E, Khondoker F, Kandiah S. Constipation in children and adolescents: evaluation and treatment. *American family physician*. 2022 May;105(5):469-78.
- Aral N, Thapa M, Kunwar BR, GC B, Lamichhane K. Sociodemographic and Clinical Characteristics of Functional Constipation in Children Receiving Care at a Tertiary Hospital: An Observational Study. *Journal of the Nepal Medical Association*. 2025 Nov 1;63(291).
- D'Souza D, Choezin T, Kumar AP, Mathew S, Das K. Functional constipation in children attending the pediatric surgery outpatient department of a tertiary care hospital. *Indian Journal of Community and Family Medicine*. 2025 Jul 1;11(2):96-100.

- Adil S, Gordon M, Hathagoda W, Kuruppu C, Benninga MA, Rajindrajith S. Impact of physical inactivity and sedentary behaviour on functional constipation in children and adolescents: a systematic review. *BMJ Paediatrics Open*. 2024 Dec 5;8(1).
- Liu Q, Dai YE, Zhou Z, Wang S, Wang Q, Gu X, Luo X. Prevalence and influencing factors of functional constipation in Chinese children and adolescents: a systematic review and meta-analysis. *Frontiers in Public Health*. 2026 Mar 12;(14).
- Santos-Andreoli C, Vieira-Ribeiro SA, Almeida-Fonseca PC, Bandeira-Moreira AV, Machado-Rocha-Ribeiro S, Batista-de-Morais M, do-Carmo-Castro-Franceschini S. Eating habits, lifestyle and intestinal constipation in children aged four to seven years. *Nutrición Hospitalaria*. 2019;36(1):25-31.
- Inan M, Aydiner CY, Tokuc B, Aksu B, Ayvaz S, Ayhan S, Ceylan T, Basaran UN. Factors associated with childhood constipation. *Journal of paediatrics and child health*. 2007 Oct;43(10):700-6.
- Sujatha B, Velayutham DR, Deivamani N, Bavanandam S. Normal bowel pattern in children and dietary and other precipitating factors in functional constipation. *Journal of clinical and diagnostic research: JCDR*. 2015 Jun 1;9(6).
- Xinias I, Mavroudi A. Constipation in Childhood. An update on evaluation and management. *Hippokratia*. 2015 Jan;19(1)..
- Olaru C, Diaconescu S, Trandafir L, Gimiga N, Stefanescu G, Ciubotariu G, Burlea M. Some risk factors of chronic functional constipation identified in a pediatric population sample from Romania. *Gastroenterology research and practice*. 2016;2016(1).
- Tran DL, Sintusek P. Functional constipation in children: What physicians should know. *World journal of gastroenterology*. 2023 Feb 28;29(8).
- Chan JS. A community-based study of the prevalence of constipation in young children and the role of dietary fibre. *Hong Kong Med J*. 2005 Dec;11(6):431-6.
- Zheng W, Xu T, Zhou C, Wang Q, Wang M, Li H, Guo H, Chen J. Development and Validation of a Risk Prediction Model for Functional Constipation in School-Aged Children.
- Bashir SK, Khan MB. Pediatric functional constipation: A new challenge. *Advanced Gut & Microbiome Research*. 2024;2024(1).
- Adil S, Gordon M, Hathagoda W, Kuruppu C, Benninga MA, Rajindrajith S. Impact of physical inactivity and sedentary behaviour on functional constipation in children and adolescents: a systematic review. *BMJ Paediatrics Open*. 2024 Dec 5;8(1).
- Piriyakitphaiboon V, Chia MY, Chua TB, Amornchaicharoensuk Y, Sirimongkolchaiyakul O. Relationship between screen use, physical activity, sleep duration and bladder and bowel dysfunction in Thai children. *BMC Pediatrics*. 2026 Mar 7.
- Kumar K, Gupta N, Malhotra S, Sibal A. Functional constipation: a common and often overlooked cause for abdominal pain in children. *Indian Journal of Gastroenterology*. 2023 Apr;42(2):274-8.
- Li Y, Yu Y, Wu X, Liu B, Ma H, Zhao X, Cao S, Ding S, Li T, Wang X, Wang P. Specially designed yogurt supplemented with combination of proand prebiotics relieved constipation in mice and humans. *Nutrition*. 2022 Nov 1;103:1-8.
- Wu Y, Li Q, Cao J, Fan F, Gan L, Wu R, Jin J, Chen R, Sun L, Zhang Z, Lai X. Aged black tea alleviates constipation in mice by modulating intestinal neurotransmitters and decreasing AQP3 and AQP9 expression. *Food & Nutrition Research*. 2023 Oct 30;67:10-29219.

- Kim HR, Park IS, Park SB, Yang HJ, Jeong DY, Kim SY. Comparison of laxative effects of fermented soybeans (Cheonggukjang) containing toxins and biogenic amines against loperamide-induced constipation mouse model. *Nutrition Research and Practice*. 2022 Aug 1;16(4):435-49.
- El Mouzan M, Kambal M, Alabdulkarim H, Alshammari NR, Alanazi R, Al Sarkhy A, Alhamid N, Assiri AM, Alzahrani A, Shaik SA, Alasmi M. Clinical profile of functional constipation in Saudi children. *Annals of Saudi Medicine*. 2024 Mar;44(2):111-5.
- Darma A, Sumitro KR, Muhandi L, Vandenplas Y, Hegar B. Rome IV Clinical Criteria and Management of Functional Constipation: Indonesian Health Care Professionals' Perspective. *Pediatric gastroenterology, hepatology & nutrition*. 2024 Mar 4;27(2):2-11.
- Hyams J, Colletti R, Faure C, et al. Functional gastrointestinal disorders: working group report of the first world congress of paediatric gastroenterology, hepatology and nutrition. *J Pediatr Gastroenterol Nutr*. 2002;35;S(1).
- Singhal PK, Gupta P, Mathur M. The effects of lifestyle changes like diet, toilet habits, physical activity and others in children with functional constipation. *International Journal of Contemporary Pediatrics*. 2023 Nov;10(11).
- Katsirma Z, Dimidi E, Rodriguez-Mateos A, Whelan K. Fruits and their impact on the gut microbiota, gut motility and constipation. *Food & function*. 2021;12(19).
- Su H, Chen J, Miao S, Deng K, Liu J, Zeng S, Zheng B, Lu X. Lotus seed oligosaccharides at various dosages with prebiotic activity regulate gut microbiota and relieve constipation in mice. *Food and Chemical Toxicology*. 2019 Dec 1;134(1).
- Paul A, Punati J. What is the evidence for over the counter laxatives to treat childhood constipation?. *Current Gastroenterology Reports*. 2021 Nov;23(11):4-9.
- Salvatore S, Battigaglia MS, Murone E, Dozio E, Pensabene L, Agosti M. Dietary fibers in healthy children and in pediatric gastrointestinal disorders: a practical guide. *Nutrients*. 2023 May 6;15(9):9-17.
- Pop D, Pop RS, Farcău D. The Use of Fibers, Herbal Medicines and Spices in Children with Irritable Bowel Syndrome: A Narrative Review. *Nutrients*. 2023 Oct 12;15(20):2-11.