

## • Review

# Prevention and treatment of constipation in children from the perspective of Iranian traditional medicine

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### ABSTRACT

Constipation is one of the most common complaints of children and a common cause of referrals to pediatricians. Numerous reasons for this disease have been mentioned in the Iranian traditional medicine (ITM). It is believed that this disorder is mostly due to the lack of consideration of the six essential principles (*Setteh-ye-Zarurieah*), which are necessary to maintain health and prevent disease. In this descriptive study we collected and classified the concepts related to the topic by reviewing reliable ITM text books. Scientific databases were also searched for the most commonly used herbs in the treatment of constipation. The results showed that, from the perspective of ITM, the first step in treating constipation in children is making lifestyle changes. This includes giving appropriate training in the six essential principles, and making modification in existing habits where necessary. In the next steps, using some herbal remedies for topical or oral administration is recommended. On the other hand, a few clinical trials have been done concerning the effects of herbal medicines on pediatric constipation. Therefore, ITM's preventive and curative strategies can provide an efficient and cost-effective way to address constipation in children. This study can serve as a preface to performing clinical studies in this field.

**Keywords:** children; constipation; Iranian traditional medicine; six essential principles

**Citation:** Motaharifard MS, Jafari Z, Paknejad MS, Oveidzadeh L, Karimi M. Prevention and treatment of constipation in children from the perspective of Iranian traditional medicine. *J Integr Med.* 2016; 14(6): 429–435.

## 1 Introduction

Constipation is a common problem, affecting up to 30% of children, and accounting for an estimated 3%–5% of all visits to pediatricians and 10%–25% referrals to gastroenterology clinics<sup>[1]</sup>. Constipation has been accounted for a prevalence rate of up to 43% among hospitalized children<sup>[2]</sup>. Most studies report similar

prevalence rates for boys and girls<sup>[1]</sup>.

Functional constipation is responsible for more than 95% of constipation in healthy children one year and older, and is particularly common among preschool-aged children<sup>[3]</sup>.

There is not one specific definition for constipation, but the general range of symptoms include bowel movements fewer than three times per week, hard and pebbly stool

[http://dx.doi.org/10.1016/S2095-4964\(16\)60278-9](http://dx.doi.org/10.1016/S2095-4964(16)60278-9)

Received June 21, 2016; accepted August 21, 2016.

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that is difficult to pass, painful defecation, and a feeling of incomplete evacuation<sup>[4,5]</sup>. There are a wide range of prevention and treatment interventions, which can greatly improve the quality of life in children<sup>[6]</sup>. However, there is no information concerning the maximum dosage, course of treatment and long-term side effects of the applied medications in treating pediatric constipation, therefore treatment is symptomatic and largely reliant on clinical experience<sup>[7]</sup>.

Herbal therapy text books and reference books contain information on constipation. However, there is not a separate chapter dedicated to pediatric herbal therapy and there are few articles published on the advantages and limitations of herbal medicines in children<sup>[8]</sup>.

Iranian traditional medicine (ITM) is one of the complementary and alternative medicine (CAM) that has many strategies to prevent and treat diseases in various stages of life, including childhood.

Considering the popularity of CAM therapies in recent years—often due to parents’ desires for non-invasive therapies that are easy to access—this study was carried out to review the literature on preventive and curative approaches and recommendations of ITM in childhood constipation. The study aims to find the most cost- and therapeutically-effective methods to relieve the symptoms of chronic functional constipation in children.

## 2 Methods

We reviewed the ITM recommendations for constipation in children mentioned in the highest number of reference books in ITM, including the *Al-Qanun fi al-Tibb*<sup>[9]</sup>, *Zakhireye Kharazmshahi*<sup>[10]</sup>, *Exir-e-Azam*<sup>[11]</sup>, *Kholase al-Hekmah*<sup>[12]</sup>, *Mufarrih al-Qulub*<sup>[13]</sup>, *Resale fi Alaj al-Atfal*<sup>[14]</sup>, *Tadbir al-Sebyan*<sup>[15]</sup> and *Tadbir al-Hobali val-Atfal val-Sebyan*<sup>[16]</sup>. Our traditional words for extracting the first results were “*Eateghal-e-batn*”,

“*Aghl-e-Batn*”, “*Yoboosat-e-Mezaj*”, “*Ghabz-e-Shekam*” and “*Hasr-e-Tabia’r*” which were synonymous with constipation, combined with “*Atfal*” and “*Sebyan*” which were synonymous with children. Also, textbooks of internal medicine and pediatrics such as *Harrison’s Principles of Internal Medicine*<sup>[4]</sup> and *Nelson Essentials of Pediatrics*<sup>[5]</sup> were used to identify some terms related to pediatric constipation, then the terms were cross-searched. Traditional names of the medicinal materia in ITM used to treat pediatric constipation were matched to scientific names used in botanical textbooks<sup>[17,18]</sup>.

On the next step, the most frequently used and accessible plants were selected and a literature search was performed in the scientific databases including PubMed, ScienceDirect, Google Scholar, Iranmedex and SID (the last two are Iranian databases). For this purpose, the terms “constipation” and “pediatric constipation” in combination with the scientific plant names were used as the keywords. Data were collected in English from the year 1915 until April 2015. Related results were classified and readout repeatedly by authors to create main themes. Finally, “content analysis” was used for data analyzing.

## 3 Results

### 3.1 Definition of constipation

Having an adequate definition of constipation requires that we explain the characteristics of normal stool. Masters of ITM have suggested some characteristics for normal stool, which were listed below in Table 1.

Thus from the perspective of ITM, constipation refers to (1) fecal amount is proportionally less than the amount of food ingested; or (2) hard and dry stool; or (3) decreased frequency of bowel movements.

There is also no specific definition for pediatric constipation. From the perspective of modern medicine, children with constipation may experience fewer bowel

**Table 1** Characteristics of normal stool in Iranian traditional medicine<sup>[12,19]</sup>

Feature	Definition of traditional medicine
Appearance	Homogeneous and condense
Color	Yellowish (In the condition that any chromatic substance is not taken before)
Consistency	Neither very dense nor so diluted (something like honey)
Frequency	Once per meal
Amount	Proportionate to the intake, mean in amount
Smell	Neither smelly nor odorless
Passing	Voluntary, without difficulty, pain or anal irritation
Bowel sounds	None
Foam	None
After defecation	A feeling of lightness in the body

movements than normal, or difficult and painful bowel movements. The normal interval for defecation in children depends on the age and type of diet; neonates have up to 4 bowel movements daily during the first week, and the rate is higher among breastfed infants compared to those who use formula. The frequency reduces to 3 times daily in the first year and 1–2 times a day during the next 2–4 years<sup>[20]</sup>. In many sources, a 3-month period of having fewer than 3 bowel movements per week is defined as pediatric chronic constipation<sup>[21]</sup>. Painful defecation, usually caused by a bulky hard stool, is also considered to be constipation<sup>[20]</sup>. Generally, in addition to considering the age range, individual bowel habits and intervals need to be taken into consideration when diagnosing constipation.

### 3.2 Causes of constipation

According to ITM textbooks, the passing of stool depends on three factors: the motile (stool), the stimulus (expulsive faculty) and the passageway (intestine lumen)<sup>[19]</sup>. Causes of constipation are also classified according their impact on these three factors (Table 2).

Early Persian physicians have suggested 2 particular causes for pediatric constipation: intestine wetness dominance (leading to expulsive faculty weakness) and lack of bile secretion<sup>[10,13]</sup>.

Most children with constipation have no known underlying disease. It seems that the main causes for constipation considered by ITM are similar to functional constipation in modern medicine, and in many cases they

**Table 2** Causes of constipation stated in Iranian traditional medicine

Cause	Statement
Type of nutrition	Consuming dry ( <i>Yabes</i> ) foods such as corn, rice, oats, Sumac (as used in a kind of pottage), kabob, dried meat (Ghadid), fried flour (pest), crackers or dry bread, walnuts, bananas <sup>[9–11,19,22]</sup> Consuming highly-absorbable foods that leave little bulk such as soft-boiled egg yolks, meat and milk <sup>[13]</sup> Decreased intake of food and fluids: in this condition, the body reduces disposal to meet essential needs <sup>[11,22]</sup>
The time that stool stays in the intestines (The longer stool stays in the colon, the more it becomes hard and dry)	A weak expulsive faculty <sup>[9–11,19]</sup> Loss of intestinal sensation due to extreme cold temperament in the intestines, narcotics or sores <sup>[9,11,22]</sup> Abdominal muscle weakness <sup>[9,11]</sup> Little or no secretion of bile into the intestine <sup>[9,11]</sup> A weak digestive action which increases the overall transit time for food to pass through the digestive system <sup>[13]</sup> Voluntary stool retention <sup>[11]</sup>
Dystemperament ( <i>sue-e-mezaaj</i> )	Intense heat in the whole body, liver or kidneys <sup>[12]</sup> Hot dystemperament of the intestines <sup>[9–11,19,22,23]</sup> Dry dystemperament of the intestines <sup>[11,22]</sup> Dystemperament due to sticky phlegm humor (cause intestinal obstruction) <sup>[11]</sup>
Excessive body expenditure	Excessive absorption of intestinal moistures through Masariqa (Mesenteric veins) <sup>[9–11,19,22,23]</sup> Excessive sweating (from heavy exercise, hot baths, diaphoretic exercises or porous body) <sup>[9,10,19,22]</sup> Liquid loss via excessive urination, diarrhea or other pathways (the intestinal membranes absorb the liquid in stool because of excessive dryness in the body, leading to a hard and dry stool) <sup>[9–11,19,22]</sup> Exposure to heat, such as glass and forging works <sup>[9,22]</sup> Hot weather (this will cause moisture loss) <sup>[9,22]</sup>
Intestinal torsion	Gas retention <sup>[11]</sup> Detachment of intestinal tendinous adhesions <sup>[11]</sup> Peritoneal hernia (causing intestinal displacement) <sup>[11]</sup> Parasites plurality and congestion <sup>[11]</sup> Dry stool <sup>[11]</sup>
Inflammatory diseases	Ulcerative proctitis (leading to fecal retention) <sup>[11]</sup>
Infectious diseases	Parasitic infection with tapeworms <sup>[11]</sup>
Drugs	Astringent, diuretic, diaphoretic or anti diarrheal medications <sup>[13]</sup>



are preventable and treatable with lifestyle modification<sup>[24]</sup>.

### 3.3 Prevention and treatment methods

#### 3.3.1 Lifestyle modification

In ITM, there are six essential principles (*Settehye-Zarurieah*) known as the first step in prevention and treatment of diseases, which were mentioned as “weather”, “eating and drinking”, “body movement and repose”, “sleeping and awakening”, “retention and release”, and “mental states”. Their imbalances primarily cause dystemperament and thereby give rise to various diseases<sup>[9]</sup>. Observing these six essential principles has an important effect on pediatric constipation compared with other traditional modalities. It can be the method of choice in the aspects of priority, importance and safety.

**Weather:** Children should be protected from extreme cold, because cold weather compresses the skin pores and reduces sweating, thus causing more urination and less defecation. Also, the anus and rectum are contracted in cold weather causing decreased ability to expel feces<sup>[10]</sup>. However, children should also avoid exposure to very hot environments such as playing in the sun on summer afternoons, because there is a higher body fluid loss in hot weather, which can cause a dry and hard stool in susceptible children<sup>[21]</sup>.

**Eating and drinking:** As mentioned before, a person’s diet can affect bowel habits. As long as the infant takes breastmilk and does not consume any other food, modifying the mother’s diet to affect the milk is the best method for adjusting the infant’s bowel habits. For this reason, mothers are recommended to consume soups containing beets, spinach and plums with tamarind seasoning. After infancy, treatment is similar to that used for adults, but differs in quantity<sup>[14]</sup>. We can prevent constipation in older children by observing their temperament and modifying diet accordingly. For example, adequate fluid and fruit intake, along with a high fiber diet, is recommended in thin children who might have a hot temperament, while such a regimen may worsen the symptoms in overweight children with a cold temperament<sup>[21]</sup>.

**Body movement and repose:** Moderate exercise is conducive for good health in any age, but excessive physical activity that results in excessive sweating and dehydration can cause or exacerbate constipation in children with warm temperaments, whereas moderate physical activity can improve the condition of overweight children with cold temperaments<sup>[25]</sup>.

**Sleep habits:** Prolonged period with lack of sleep causes dryness in the body and would exacerbate constipation, particularly in children with a warm temperament. Laying down or sleeping immediately following a meal is not recommended for obese children with wet temperaments<sup>[21]</sup>. Therefore, management for

the proper time and duration of sleep based on the child’s temperament is recommended.

**Retention and release:** Taking a long bath that causes excessive sweating (*i.e.*, release) is one reason for constipation<sup>[13,19]</sup>. Another pattern of excessive release is overuse of diuretics or laxatives that dehydrate the body, dry out the stool in the bowel and cause constipation and difficult defecation<sup>[11]</sup>.

**Mental states:** Happiness and joy stimulate the intestine and facilitate defecation. It is better to tell refreshing, enlivening and funny stories to children and provide a stress-free living place for them<sup>[26]</sup>.

#### 3.3.2 Pharmacotherapy

Using remedies from the ITM material medica is the next step in the treatment of pediatric constipation. Due to the predominantly moist and feeble nature of children, it is very important to accurately select medicinal treatment with specific properties to appropriately address each child’s temperament<sup>[19]</sup>.

In ITM, many herbal, animal or mineral sources are recommended for constipation. These can be applied in various forms such as oral, suppositories, topical ointment or enema. Here are some examples of drugs used to treat constipation in children (Table 3).

Whereas the ITM suggests a specific treatment for each person, the treatment can be selected according to the person’s temperament and based on the quality and specifications of the medicinal treatment. Furthermore, referring to ITM textbooks is recommended to find the method and dosage of each prescription<sup>[28]</sup>.

Masters of ITM believed that the first step in treatment of pediatric constipation is using suppositories and topical medications. The non-oral methods are also preferred if the child avoids taking the drug or does not tolerate the taste. If the complaint still exists or a medical or physical situation prohibits these types of application after using these methods, oral laxatives will be prescribed based on the child’s conditions and temperament. However, if it is necessary to take the drug orally, it can be mixed with the child’s food or some *nabat* (a kind of candy) can be added<sup>[13]</sup>. If constipation is accompanied with fever, it is forbidden to apply topical ointment on the abdomen, hot natured suppositories, or to give astringent spices with hot components<sup>[19]</sup>.

#### 3.4 New studies

By searching scientific databases, the results show a small number of studies on the efficacy of the noted plants in Table 3. In a randomized clinical trial performed on the effect of *Cassia fistula (folus)* in pediatric constipation, *C. fistula* emulsion was more effective than mineral oil in the three-week treatment of children with functional constipation<sup>[29]</sup>. The laxative and purgative effect of *Alhagi persarum (taranjabin)* on rats has been studied,

**Table 3** Plants used to treat constipation in children

Traditional name	Scientific name	Plant family	Part used	How to use
<i>Khiar shanbar (folus)</i>	<i>Cassia fistula</i>	Fabaceae	Fruit pulp	Oral: (1) plus <i>Viola odorata</i> oil <sup>[14]</sup> ; (2) as jam <sup>[11]</sup> Suppository: as a component <sup>[19]</sup>
<i>Banafsaj</i>	<i>Viola odorata</i>	Violaceae	Flower	Oral: (1) plus sugar and warm water <sup>[11]</sup> ; (2) plus almond oil <sup>[11]</sup> Suppository: (1) the oil plus <i>Saccharum officinarum</i> L. and salt <sup>[11,27]</sup> ; (2) plus sugar (if febrile) <sup>[13,19]</sup> Topical application: oil <sup>[14]</sup> Enema: oil <sup>[15]</sup>
<i>Loz (badam)</i>	<i>Prunus amygdalus</i>	Rosaceae	Fruit	Oral: (1) oil <sup>[11]</sup> ; (2) peeled fruit <sup>[11]</sup>
<i>Bazr-e-ghatoona (esfarzeh)</i>	<i>Plantago ovata</i>	Plantaginaceae	Seed	Oral <sup>[11]</sup>
<i>Tin (Anjir)</i>	<i>Ficus carica</i>	Moraceae	Fruit	Oral <sup>[11]</sup>
<i>Zabib (maviz)</i>	<i>Vitis vinifera</i>	Vitaceae	Dried fruit	Oral <sup>[11]</sup>
<i>Halileh siah</i>	<i>Terminalia chebula</i>	Combretaceae	Fruit	Oral: as a part of a laxative pill <sup>[11,27]</sup>
<i>Halileh zard</i>	<i>Terminalia chebula</i>	Combretaceae	Fruit peel	Topical application <sup>[11]</sup>
<i>Zorombad</i>	<i>Curcuma zedoaria</i> Rosc.	Zingiberaceae	Root	Oral: as a part of a laxative pill <sup>[11,27]</sup>
<i>Razianaj (badian)</i>	<i>Foeniculum vulgare</i>	Umbelliferae	Seed	Oral: (1) as a part of a laxative pill <sup>[11]</sup> ; (2) powder <sup>[11]</sup>
<i>Taranjabin</i>	<i>Alhagi persarum</i> Boiss.	Papilionaceae	Manna	Suppository: as a component <sup>[13]</sup>
<i>Tankar (Bureh)</i>	<i>Sodium tetraborate</i> (Borax-Tincal)	A mineral substance, a salt of boric acid		Oral: (roasted tincal) as a part of a laxative pill <sup>[11,27]</sup>
<i>Gharighun</i>	<i>Polyporus officinalis</i> Fries.	Polyporaceae	Root	Oral: as a component of a pill <sup>[11]</sup>
<i>Ravand</i>	<i>Rheum palmatum</i>	Polygonaceae	Root	Oral: as a component of a pill <sup>[11]</sup>
<i>Ghafeth</i>	<i>Agrimonia eupatoria</i>	Rosaceae	Flower	Oral: as a component of a pill <sup>[11]</sup>
<i>Mastaki</i>	A resin obtained from the mastic tree ( <i>Pistacia lentiscus</i> L.)	Anacardiaceae	Resin	Oral: plus sugar and warm water <sup>[11]</sup>
<i>Elk al-botm (saghez)</i>	<i>Pistacia atlantica</i> Desf.	Anacardiaceae	Resin	Oral <sup>[16]</sup>
<i>Khatmi</i>	<i>Alcea lavateriflora</i> (DC). Boiss, <i>Alcea digitata</i> (Boiss.) Alef.	Malvaceae	Flower	Suppository: (1) plus sugar and salt <sup>[14]</sup> ; (2) as a component <sup>[13,19]</sup>
<i>Vard</i>	<i>Rosa damascena</i> Mill.	Rosaceae	Petal	Suppository: the oil plus soap <sup>[19]</sup>
<i>Sana</i>	<i>Cassia angustifolia</i> Vahl.	Caesalpinaceae	Leaf	Oral Suppository: as a component <sup>[13,19]</sup>
<i>NaAnâ</i>	<i>Mentha spicata</i> L.	Labiatae or Lamiaceae	Leaf	Suppository: as a component with <i>Ipomoea turpethum</i> , <i>Cassia fistula</i> or olive oil <sup>[27]</sup>
<i>Torbod-e-sefid</i>	<i>Ipomoea turpethum</i>	Convolvulaceae	Root	Suppository: as a component <sup>[27]</sup>
<i>Foodanaj</i>	<i>Mentha longifolia</i>	Labiatae	Leaf	Suppository: as a component <sup>[9,13]</sup>
<i>Shekar-e-sorkh</i>	<i>Saccharum officinarum</i>	Poaceae	Stem extract	Oral <sup>[11]</sup> Suppository: plus soap <sup>[13]</sup>
<i>Zeytoon</i>	<i>Olea europaea</i>	Oleaceae	Fruit	Topical application: oil <sup>[11]</sup>
<i>Soosan-e-asmanjoooni</i>	<i>Iris florentina</i>	Iridaceae	Root	Suppository <sup>[9,13]</sup>
<i>Shahesfaram (Reyhan)</i>	<i>Ocimum basilicum</i> , <i>O. minimum</i>	Lamiaceae	Leaf	Suppository: plus honey <sup>[16]</sup>
<i>Bokhur maryam</i>	<i>Cyclamen europaeum</i>	Primulaceae	Flower	Topical application <sup>[9,13,19]</sup>
<i>Khervâ (bid anjir- karchak)</i>	<i>Ricinus communis</i>	Euphorbiaceae	Seed	Topical application: oil <sup>[11]</sup>
<i>Sebr</i>	<i>Aloe barbadensis</i> , <i>A. littoralis</i>	Xanthorrhoeaceae	Resin	Topical application <sup>[18]</sup>
<i>Ezkher</i>	<i>Andropogon schoenanthus</i>	Poaceae	Blossom	Topical application <sup>[16]</sup>
<i>Ma-ol-asal</i>	Honey (hydromel)			Enema <sup>[16]</sup>

with results suggesting it possesses an efficient laxative effect<sup>[30]</sup>. A double-blind clinical trial which compared *Saccharum officinarum* L. (*shekar-e-sorkh*) with polyethylene glycol indicated that it is an effective and low-cost treatment for pediatric constipation<sup>[31]</sup>. A study on rats showed that treatment with *Ficus carica* product may be a useful strategy in prevention and treatment of chronic constipation<sup>[32]</sup>. In another study in Korea, it was revealed that *F. carica* (Tin) can be useful as a complementary medicine in patients with chronic constipation, especially those who have an improper diet<sup>[33]</sup>. In an animal study to assess the effect of *Prunus amygdalus* (Loz) on colon cancer, it was observed that various almond products increase colon motility and improve bowel transit times<sup>[34]</sup>. Effects of olive oil as a laxative had been pointed out in several studies, which may improve bowel movements and prevent constipation in adults and children<sup>[35-38]</sup>. Several studies were available in the case of *Plantago ovata* (*esfarzeh*) and its laxative effects and even its application in children had been studied<sup>[39,40]</sup>. Butter also can help patients suffering from constipation as a part of their diet and is frequently mentioned in the literature<sup>[41,42]</sup>.

#### 4 Discussion

Although the causes of constipation are presented in detail in reference books of ITM, constipation in children is not discussed in pediatric traditional textbooks. A damp temperament and lack of bile secretion were considered the major causes of constipation in children, which resulted in other factors that may also contribute. Too much body moisture weakens the children's gastrointestinal function, induces a cold temperament of the intestines, creates a weak and immature digestive system that is incapable of digesting different types of foods, and thus puts children at risk of dyspepsia and constipation.

As mentioned before, in ITM the lifestyle modification is used prior to medical treatment in handling constipation, and is considered the cornerstone in preventing or reducing this complaint. For this purpose the six essential principles should be taught to children and their parents. Dietary recommendations and selecting proper food in accordance with age and the child's temperament are necessary. Appropriate foods include spinach, carrot and barley soups, while reduce the amount of dry foods consumed. Digestive tonics like citron (*balang*) and quince jam after meals are recommended for strengthening the digestive system in children. Observing guidelines such as eating in a calm and quiet place, correct and sufficient chewing habits, and not eating too many types of foods in one meal can all help with proper digestion. Having moderate physical activity

befitting the child's temperament, healthy sleep patterns, and balanced evacuation and retention at the correct times (toilet training) are all beneficial factors. Also a calm environment without anxiety helps a lot.

In ITM, it is recommended to treat infants with constipation through modifying the mother's breastmilk and prescribing appropriate and safe laxatives. Special prescriptions have been mentioned for older children (Table 3), although they can be treated like adults considering with modified dosages. Enema is less frequently prescribed among the various methods, maybe because it is unpleasant for children. Suppositories and ointments are frequently prescribed because of their lower risk of complications compared to the oral form. Ointments are also easier to use in children. While most children resist taking oral medicines, topical ointment accompanied with abdominal massage is enjoyable for them. The Iranian medical tradition has rich information on treating pediatric constipation, which is not present in conventional medicine.

According to this study, most of the suggested medicinal plants listed in Table 3 have not been under systematic clinical trials. This review can be an introduction to design clinical trials based on each simple plant or combined medicinal treatment in the future.

#### 5 Conflict of interest

None declared.

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