

## R E V I E W

# Constipation in pregnancy: causes and remedies

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**Summary.** Constipation is a common gastrointestinal complaint in pregnancy that occurs in about 11-40% of the women. It is described by symptoms like pain, distress, straining, hard lumpy stools and a sense of incomplete bowel evacuation. Diet rich in fiber and increased fluid intake is recommended to improve defecation. The use of laxatives and probiotics is also reported to alleviate constipation, though the safety and efficacy of laxatives and probiotics on the mother and fetus need to be established. This review article provides an insight on different factors leading to constipation in pregnancy and evaluation of different remedies used for the treatment of constipation in pregnancy.

**Key words:** constipation, pregnancy, laxatives, probiotics

## Introduction

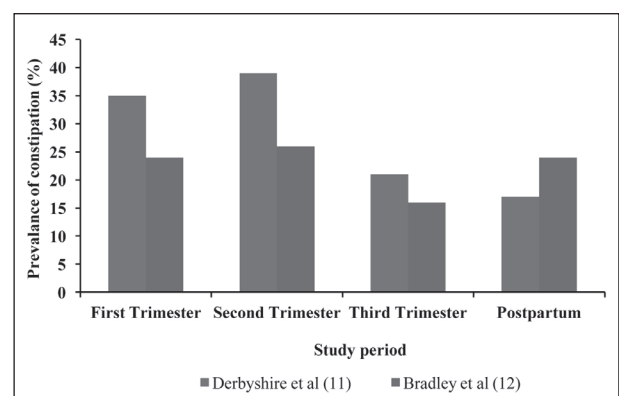
Constipation, functional bowel disorder, is defined as problematic bowel clearing described by hurting, lumpy or dry and hard stools, feeling of partial evacuation, anorectal blockade, or the use of manual manoeuvres (1). At physical inspection, a tangible faecal mass is frequently present in the abdomen or the rectum (2,3). Conferring to the Rome III standards, prolonged functional constipation in adults is represented as having two or more of the succeeding symptoms for a minimum of three months: hard or lumpy stools/ straining/ feeling of partial evacuation/ anorectal blockade/ the usage of manual manoeuvres to assist in minimum 25% of excretions or less than three defecations each week; slack stools are seldom extant without the usage of laxatives (4,5).

## Prevalence of constipation

Constipation is a frequently found sign during pregnancy and up to 11-40% of pregnant women experience it at some stage of their pregnancy (6,7). It happens frequently in the third trimester (6-9 months) while the indications can be existent from 12 weeks of

gestation. It can progress in primigravidas that do not present any earlier bowel problems. Most of the women having problem of constipation prior to pregnancy complain about worsening of their indications (8,9).

In a study conducted on 7771 pregnant women, 37.5% of women reported signs of constipation at some phase during their pregnancy (10). Derbyshire et al (11) and Bradley et al (12) studied the prevalence of constipation in pregnant women during gestation and postpartum and found that functional constipation was highest during the second trimester of pregnancy (Fig. 1).



**Figure 1.** Prevalence of constipation in pregnant women (11,12)

## Factors causing constipation in pregnancy

Constipation in pregnant women is a multifactorial ailment. Physical, anatomical and hormonal fluctuations play significant roles in the progress of the signs (13-20). The factors causing constipation in pregnant women include 1. Increased colonic water and sodium absorption during 12<sup>th</sup> to 20<sup>th</sup> week of pregnancy (21) 2. Enhanced release of progesterone, estrogen and relaxin may be accredited to relaxation of intestinal smooth muscle throughout the pregnancy by reducing the gastric, esophageal and colonic muscle contractility (8,13,15,19). 3. Inhibition of motilin, a hormone identified generally to stimulate smooth muscle and movement through the gastrointestinal tract (13,17,22). 4. Fetal development in late gestation can cause intestinal malrotation. The hostile association amid the fetus and the uterus can end result in dextrorotation of the uterus. These collective actions of the intestinal tract and uterus have been described to hinder forward movement of solid feces, interrupt defecations and decrease intestinal transit time (23,24). 5. Decreased maternal activity or sedentary lifestyle (25) 6. Routine iron supplementation in the pregnant population (26).

## Treatment

Certain substances help patients in getting relief from constipation. Some of these include the increased use of dietary fiber, fluids and daily exercise. Use of probiotics is also found to be helpful in constipation. However, if these substances fail to relieve constipation, then use of laxatives like bulk forming agents, stool softeners, lubricant laxatives, osmotic laxatives and stimulant laxatives is also found in literature but limited studies have been done in this regard. In pregnant women, treatment using laxatives means that they are effective, non-teratogenic, not excreted in the breast milk and well tolerated (13,27).

## Increased fluid intake

Insufficient fluid consumption is a risk factor for

constipation. Derbyshire et al (11) evaluated the association between water intake and constipation. They found that women with high prevalence of constipation in the second semester consumed less water in first semester as compared to non-constipated women in the same semester. Garcia et al. (28) suggested that an adequate fluid intake (about 8 glasses of water a day and a glass of fruit juice, especially plums) helps to prevent constipation.

## Increased use of dietary fiber

Addition of fiber (bran, corn or wheat based supplement, fruits with high moisture content like prunes, pears, apples) in the diet may improve constipation symptoms. Fiber supplementation during pregnancy (20-35 g/day) upturns the incidence of defecation and ends up in softer stools (29). Dietary fibers stimulate normal laxation and prevent constipation. Fiber-rich diet also reduces the risk of colon cancer (30).

Anderson et al (6) investigated the role of dietary supplement on constipation in pregnancy. Forty women in two intervention groups were given 10 g dietary supplement per day, either as corn based biscuits or as 23 g wheat bran for two weeks in the third trimester of pregnancy. They concluded that added dietary fiber, either as corn based biscuit or wheat bran, is equally useful in improving bowel frequency at 2 weeks in constipated pregnant women and dietary supplement showed no adverse effect. Bradley et al (12) conducted questionnaire based study to assess the correlation between constipation during pregnancy and the amount of daily fiber intake. However, they found no significant difference between women with constipation and women without constipation in the first trimester regarding fiber intake and fiber supplementation.

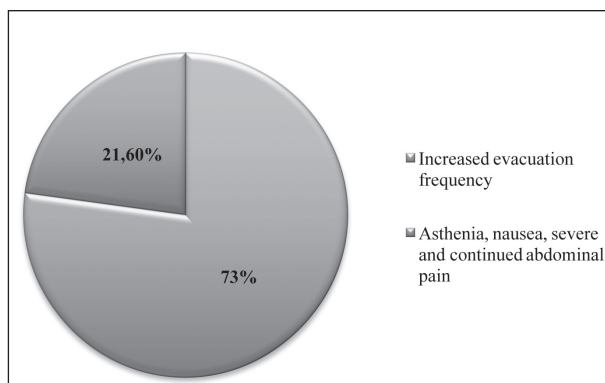
## Bulk forming agents

Bulk-forming agents, such as methylcellulose, psyllium, calcium polycarbophil and hydrolyzed guar gum are commonly used for the treatment of constipation during pregnancy. These are considered safe for long term use in pregnancy because they are not absorbed nor linked to greater risk of deformities. How-

ever, some side effects like bloating, gas and cramping are found to be associated with the use of these agents (13). Greenhalf et al (31) studied the effect of bulk forming agents on constipation in pregnant women and concluded that bulk forming agents decreased the problem of unresolved constipation in about 50% of the subjects.

### Osmotic laxatives

Osmotic laxatives include lactulose, polyethylene glycol, sorbitol (70%) and salts (Magnesium citrate, magnesium sulfate, potassium chloride and sodium chloride). They work by increasing the osmolar tension resulting in increased amount of fluid retained in the gut distention, peristalsis, and evacuation. Osmotic laxatives have recognized to be harmless for mother and fetus and consequently should be deliberated in the management of constipation during pregnancy (32). Polyethylene glycol based laxatives precisely meet the standards for the best treatment in constipation (33). Neri et al (34) studied the effect of polyethylene glycol electrolyte solution (PEG-4000) on 37 pregnant women. PEG-4000 administration for 15 days resulted in an improved evacuation frequency in 73% of women. However, 8 out of 37 women (21.6%) reported some adverse effects (Fig. 2). Meng et al. (35) and Huang et al. (36) reported lactulose as an effective and safe treatment for puerperal and postpartum con-



**Figure 2.** Effect of polyethylene glycol electrolyte solution (PEG-4000) on constipated pregnant women (34). Subjects: 37 pregnant women, aged between 28-34 years; Study period: 6-38 weeks gestation; Dosage: 250 ml PEG-4000 solution, two times a day and then 250 ml/day for 15 days

stipation. Gharehbaghi et al. (37) also suggested the use of lactulose and macrogol as effective agents in the treatment of protracted constipation in pregnancy as macrogol displays advantages like quicker start of bowel action and less flatulences.

### Stimulant laxatives

Stimulant laxatives comprise bisacodyl (Correc-tol, Doxidan, Dulcolax) and senna (Senokot, Ex-Lax). They increase intestinal fluid secretion and may stimulate colonic motility and reduce water absorption from large intestine (27). Stimulant laxatives have considered safe for mother and fetus (32). However, they are recommended to women who do not respond to dietary procedures, osmotic laxatives or bulking agents. Greenhalf et al. (31) compared the efficacy of bulk forming and stimulant laxatives in treating constipation by considering 70 pregnant women administrating either bulk forming or stimulant laxatives further divided into 2 groups that were given oral medication as follows: Stimulant laxatives (14 mg senna/day or 120 mg dioctyl sodium succinate plus 100 mg dihydroxyanthroquinone/day) and bulk forming laxatives (10 ml of 60% sterculia plus 8% frangula/day or 10 ml of 60% sterculia/day). Stimulant laxatives (16/70; 23%) considerably reduced the fraction of women with unsettled constipation as compared to bulk-forming laxatives (35/70; 50%); or 0.30, 95% CI 0.14 to 0.61;  $P = 0.001$ ). However, this study revealed that stimulant laxatives considerably increased the fraction of women with adversarial effects like diarrhea and abdominal pain when compared to bulk-forming agents, while there was no considerable variance between the groups to nausea. Jewel and Young (29) also reported stimulant laxatives as more effective agents than bulk forming agents in treating constipation nevertheless they might demonstrate severe side effects like hastening the contraction of smooth muscles of uterine. Rung-siprakarn et al. (38) assessed the efficiency and safety of interventions for treating constipation in pregnancy and found that as compared to bulk-forming laxatives, pregnant women who took stimulant laxatives (Normax or Senokot) showed an improvement in constipation. Twigg et al. (39) while conducting a study on

the usage of different laxatives in 119 pregnant women experiencing constipation concluded that 60% women used osmotically acting laxatives (lactulose) while bulk-forming laxatives (ispaghula) and stimulant laxatives (senna) were taken by 21.8 % and 18.5 % of the women for managing constipation.

### Stool softeners

Stool softeners (e.g. Docusate sodium) are agents that soften the stool, making it calmer to pass. They stimulate net release of water, potassium, chloride and sodium and prevent net absorption of bicarbonate and glucose in the jejunum (40). Docusate sodium is considered safe to use because it is not reported to cause any adverse effect in pregnancy by a number of researchers (41-43). However, there is only one report, in which maternal prolonged use of docusate sodium during pregnancy led to symptomatic hypomagnesemia in the neonate (44).

### Lubricant laxatives

Lubricant laxatives reduce the surface tension of bowel's liquid substances with the purpose of retaining more fluid in the stool, thus enabling evacuation and reducing spraining. Mineral oil is only nonprescription lubricant that is poorly absorbed from the gastrointestinal tract and does not give any adverse effects (45). There is debate about whether continued use of lubricant laxatives decreases the absorption of fat-soluble vitamins or not, though this seems to be hypothetical rather than actual risk (46).

### Probiotics

Probiotics are living micro-organisms that bring a health advantage on the host (47). Most likely, probiotics work in two ways in resolving constipation. Firstly, it is likely that dysbacteriosis in the gut flora contribute to constipation. Probiotics help to improve dysbacteriosis and improve bowel functions (48,49). Secondly, probiotics cause a decrease in the pH of the

colon by secreting acetic, lactic and additional short chain fatty acids and lower pH is responsible for bringing an increase in colonic peristalsis and consequently reducing the colonic transit time (48, 49).

The most commonly administered probiotics include live bacteria like *Bifidobacterium* and *Lactobacillus* species as well as nonpathogenic yeast like *Saccharomyces*. *Lactobacillus* species comprise *L. bulgaricus*, *L. acidophilus*, *L. delbrueckii*, *L. casei*, *L. fermentum*, *L. reuteri*, *L. sporogenes* and *L. rhamnosus* GG (50). *Bifidobacterium* species comprise *B. animalis*, *B. longum*, *B. adolescentis*, *B. bifidum*, *B. breve*, *B. infantis* and *B. lactis* (51). *Saccharomyces* spp. include *S. boulardii* and *S. cerevisiae* (52). They are obtainable either singly or in amalgamation like liquids, drops, tablets and oral or vaginal capsules (53). Potential controlled studies in pregnant patients are limited, however these are recommended as safe for use for both mother and fetus in pregnancy (Table 1).

### Conclusion

Constipation is a common gastrointestinal complaint during the pregnancy. The fine line of therapy for constipation consists of increased water and dietary intake and moderate amount of daily exercise. If first line of therapy proves ineffective, then bulk forming agents and laxatives are recommended as second line of therapy. Compared to bulk forming agents, laxatives seem to be more effective in treatment of constipation. However, it is recommended that laxatives should be taken for short time duration to avoid their possible side effects. Another potential remedy to treat constipation in pregnancy is the use of probiotics that do not pose any health risk in pregnant women. However, there is inadequate evidence to systematically evaluate the efficiency and safety of different agents used for treating constipation in pregnancy because of limited studies with small sample size and no meta-analysis. There is a need for a meta-analysis studies or randomized control trial for evaluation of different interventions used to treat constipation in pregnancy.

**Table 1.** Use of probiotics to treat constipation in pregnancy

Probiotics/Intervention	Participants	Period of exposure	Pregnancy outcomes	References
<i>Lactobacillus rhamnosus</i> GG	68	4-6 weeks prior to expected delivery - 6 months after delivery	No substantial variance in gestational age, method of delivery or birth weight	Kopp et al (54)
<i>Lactobacillus rhamnosus</i> GG	73	36 weeks' gestation to delivery	Not reported	Boyle et al (55)
<i>Bifidobacterium lactis</i> Bb12 and <i>Lactobacillus rhamnosus</i> GG	140	First trimester to end of exclusive breastfeeding	No substantial variance in gestational age or occurrence of cesarean section	Huurre et al (56)
<i>Lactobacillus rhamnosus</i> LC705 and GG, <i>Propionibacterium freudenreichii</i> ssp <i>shermanii</i> JS and <i>Bifidobacterium breve</i> Bb99	1223	4 weeks before expected delivery	No substantial variance in birth length, birth weight, and occurrence of vaginal delivery	Kukkonen et al (57)
<i>Lactobacillus rhamnosus</i> LC705, <i>Propionibacterium freudenreichii</i> ssp <i>shermanii</i> JS and <i>Bifidobacterium breve</i> Bb99	1223	36 weeks' gestation to delivery	No significant difference in birth weight	Kuitunen et al (58)
<i>Bifidobacterium bifidum</i> W23 and <i>Bifidobacterium lactis</i> W52	156	6 weeks prior to expected delivery	No substantial variance in the occurrence of cesarean section, birth weight, or prematurity or gestational age	Niers et al (59)
<i>Lactobacillus salivarius</i> CUL61 and <i>Lactobacillus paracasei</i> CUL08	454	36 weeks' gestation to delivery	No substantial variance in adverse events related to pregnancy or childbirth	Allen et al (60)
<i>Lactobacillus rhamnosus</i> GG and <i>Bifidobacterium lactis</i> Bb12	256	First trimester to end of exclusive breastfeeding	No substantial variance in occurrence of adverse outcomes; considerably lower birth weight and shorter birth length	Luoto et al (61)
<i>Bifidobacterium bifidum</i> W23, <i>Bifidobacterium longum</i> W108, <i>Bifidobacterium lactis</i> W52, <i>Lactobacillus casei</i> W79, <i>Lactobacillus rhamnosus</i> W71, <i>Lactobacillus plantarum</i> W62	20	4 weeks, between 12 and 34 weeks gestation	Not reported	De Milliano et al (62)

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