A Confined Survey on Constipation During Pregnancy Based on the Acuteness of Symptoms and Process of Treatment

By

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A thesis submitted to the Department of Pharmacy in partial fulfillment of the requirements for the degree of
Bachelor of Pharmacy (Hons.)

Department of Pharmacy
Brac University
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Declaration

It is hereby declared that

1. The thesis submitted is my own original work while completing degree at Brac University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

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Approval

The project titled "A confined survey on constipation during pregnancy based on the acuteness of symptoms and process of treatment." submitted by Samanta Alam Tithe of 8th semester, 2019 has been accepted as satisfactory in partial fulfillment of the requirement for the degree of Bachelor of Pharmacy (Hons.) on 22nd august, 2019.

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Ethics Statement

The study does not involve any kind of animal or human trial.

Abstract

Constipation is one of the major problems during pregnancy which disrupts normal daily life of a pregnant woman. Though it has been found to have effects on a large number of pregnant women in developing countries, no authentic estimation is available to understand the immensity of this problem in Bangladesh. Women in our country might not speak much about their maternal problems but this does not excuse the actual fact that the surrounding system is not ready to concentrate on this matter yet. Additionally, most of them take it normally or ignore it as a negligible matter. The aim of this study was to elucidate the current scenario of this problem in Dhaka city women, compare the acuteness of constipation among different age groups of pregnant women, primiparous and multiparous housewives and working women while determining the existence treatment options that might play a significant role to overcome this issue.

Keywords: constipation; acuteness; primiparous; multiparous; pregnancy; treatments.

Dedication

Dedicated to my parents

Acknowledgement

In the accomplishment of this project successfully, many people have best owned upon me their blessings and the heart pledged support, this time I am utilizing to thank all the people who have been concerned with this project.

I would like to thank the Almighty Allah for the completion of this project with success. My special thanks to the most helpful supervisor **Dr. Md. Abu Bakar** (Associate Professor, Department of Pharmacy, BRAC University) whose inspiration and valuable guidance showed me the way to complete this project. Without his constant encouragement and suggestions, it would not be possible to shape the present work. I am really grateful to our honorable chairperson, **Dr. Eva Rahman Kabir** (Professor and Chairperson, Department of Pharmacy, BRAC University) for her enormous support throughout the project. Then I would like to express my gratitude towards my parents, family and friends who willingly helped me out with their abilities in various phase of the completion of this project. I would like to thank the hospitals (Mugda Medical College & Hospital, Ad-din Women's Medical College Hospital and Better Life Hospital) and their doctors for allowing me to talk with their patients and giving me some valuable suggestions. Finally, I would like to thank all the women who participated and shared their experience for this research. Their experience enriched my knowledge and extended my range of vision.

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List of Acronyms

CAS	Constipation Assessment Scale
HRP	High Risk Pregnancy
LRP	Low Risk Pregnancy
PEG	Polyethylene Glycol
MRI	Magnetic resonance Imaging

Chapter 1

Introduction

1.1 Definition

Constipation is a very common phenomenon in pregnancy period. Constipation can be defined as infrequent defecation, hard stool(Prather, 2004). It makes difficulty in passing stool and infrequency of bowel motions, which is not secondary to an underlying cause. The primary functions of colon are to preserve water, to smooth the path of bacterial digestion of dietary fiber & to hold & remove feces. These functions are affected by colonic motility, absorption and the internal & external sphincters(Cullen & O'Donoghue, 2007).Those women who do not have chronic constipation may also suffer from this problem during pregnancy. It can remain after the baby born sometimes or even can go away(Shin, Toto, & Schey, 2015). Pregnancy is associated with a broad scale of physiologic variations in numerous organ systems throughout the body. The fluctuations of the gastrointestinal motility are very common cases during pregnancy which may result in a diversity of symptom complexes, particularly constipation, nausea and vomiting, right upper quadrant discomfort, heartburn, and diarrhea. During pregnancy, minor constipation can be treated by the patient herself, her primary care physician or her obstetrician. If it turns into severe condition, the patient may be consulted to a gastroenterologist. Familiarity with the causes of constipation in pregnancy and with a perspective to evaluating and treating this disorder in pregnant patients is important to the physicians involved in the care of the pregnant patient(Bonapace & Fisher, 1998).

1.2 Symptoms

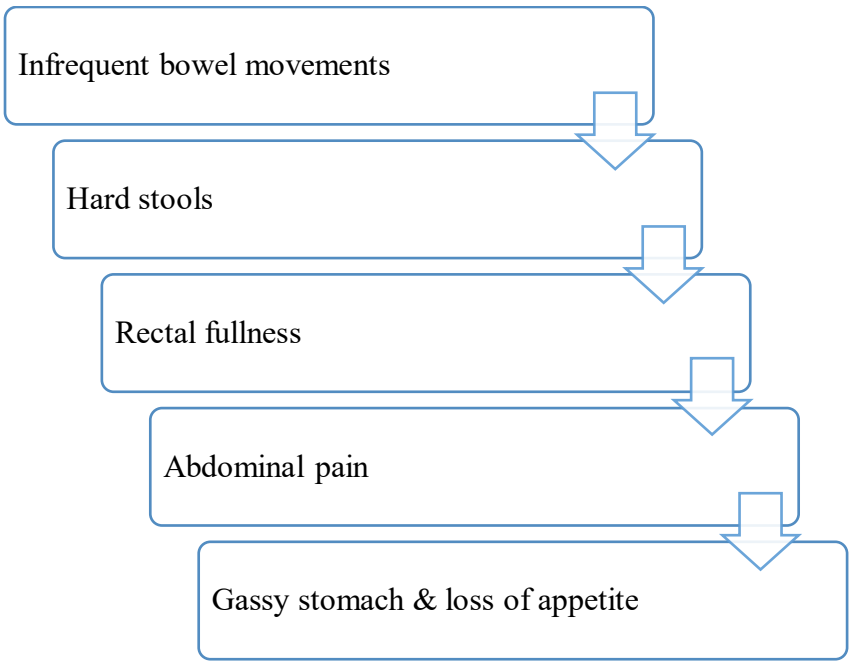


Figure 1: Symptoms of constipation during pregnancy.

1.3 Causes

Pregnancy causes a lot of hormonal changes in the body. As a result, the women often have to go through a lot of side effects or changes because of the hormonal changes during pregnancy. Constipation is one of them. The hormones are one of the main vital reason of constipation in pregnancy.

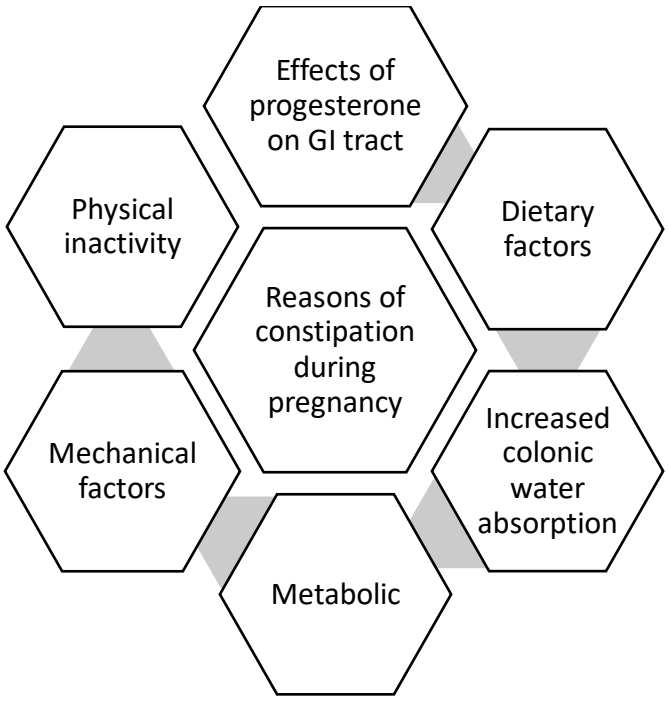


Figure 2: Etiology of constipation in pregnancy.

1.3.1 Progesterone

Pregnancy is connected with some degree of bowel hypomotility which is attributed to increased secretion of progesterone. Progesterone is the hormone which is basically responsible for this. Progesterone helps to regulate uterine muscle for functioning(Gill, Bowes, & Kingma, 1985). Elevated level of progesterone causes the contractility of muscles which subsequently slows down the transit. At the first two trimesters, the level of progesterone remains really high. For that reasons, this problem basically shows in first two trimesters where the rate is 35% & 39%. Eventually it reduced to 21% & 17% in third trimester & postpartum(Shin et al., 2015). Progesterone reduces the pressure of lower esophageal sphincter muscle which results in delay gastric emptying. It helps to inhibit the stimulatory gastrointestinal hormone(Christofides, Ghatei, Bloom, Borberg, & Gillmer, 1982)

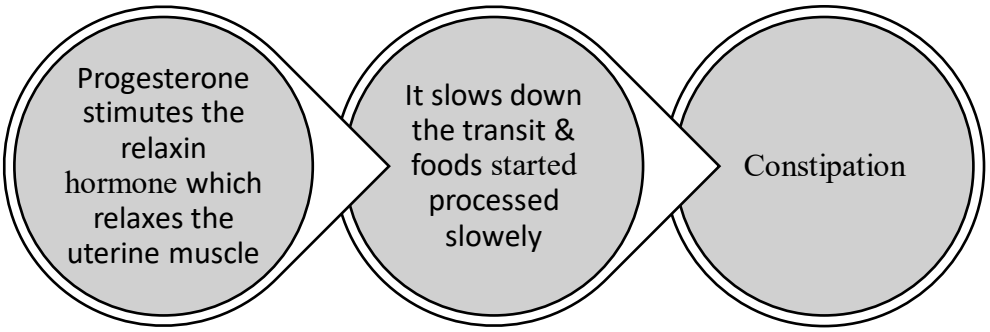


Figure 3: Pathophysiology of the role of progesterone in constipation.

1.3.2 Diet

Lack of fiber in diet and fluid can worsen the situation. Some pregnant women loose fluid because of the nausea and vomiting. Some pregnant women do not take enough vegetables in their meals. The volume of consumed food may produce colonic congestion, particularly when the transit of gastrointestinal is lessened in the second stage of pregnancy which is the 2nd trimester(Derbyshire, Davies, Costarelli, & Dettmar, 2006). As insufficient fluid may result in constipation for that reason sufficient food volume with adequate water intake is must for the pregnant women. Those women who take fats containing foods more and less amount of fiber containing foods will suffer from this kind of intestinal obstruction. It is mainly caused by insufficient dietary fiber intake but data on the effects of diet on constipation during pregnancy are mixed. A dietary supplement of fiber, in the form of bran or wheat fiber, elevated the frequency of defecation and helps to softer stools(Neri et al., 2004). To check the effectiveness of dietary fibers in treating constipation, physicians recommend dietary modifications. Only dietary fiber intake does not have a major impact in the treatment of constipation during pregnancy. It is proved that stimulant laxatives may

perform more effectively than bulk forming laxatives, but they may give some side effects which are diarrhea & abdominal pain.

1.3.3 Physical movement

Moreover, regular movements and walks are very important for a good digestion and bowel movement. Restricted exercise during pregnancy can cause constipation. Sometimes physician suggested to the patient who have complications in pregnancy like who have low lying placenta not to do certain exercises. Physical inactivity helps in exacerbating the situation. It helps to digest the foods well and to eliminate the feces. There are some exercises that induced norepinephrine and prostaglandins. Prostaglandin is useful in triggering uterine contraction. This triggered uterine contractions help in labor while the diversion of blood flow to working muscles during exercise could lower placental circulation and compromise fetal growth and helps to decrease the intestinal obstruction during pregnancy(McLean et al., 2017).

1.3.4 Hypothyroidism

Some more risk factors are also working in it. One of them is hypothyroidism. The condition where thyroid gland is unable to produce thyroid hormone is called hypothyroidism. As thyroid hormone helps in metabolism so if is not functioning well, it will affect the elimination process. Underactive thyroids are responsible for this. Hypothyroidism slows down the digestion and metabolism system which results in constipation. Constipation is considered as a symptom of hypothyroidism. The women or pregnant women who are suffering from hypothyroidism often complain about not having their bowel movement regularly. The women who have primary hypothyroidism have more thyroxine need during pregnancy(Pearlman, Tintinalli, & Lorenz, 1990).

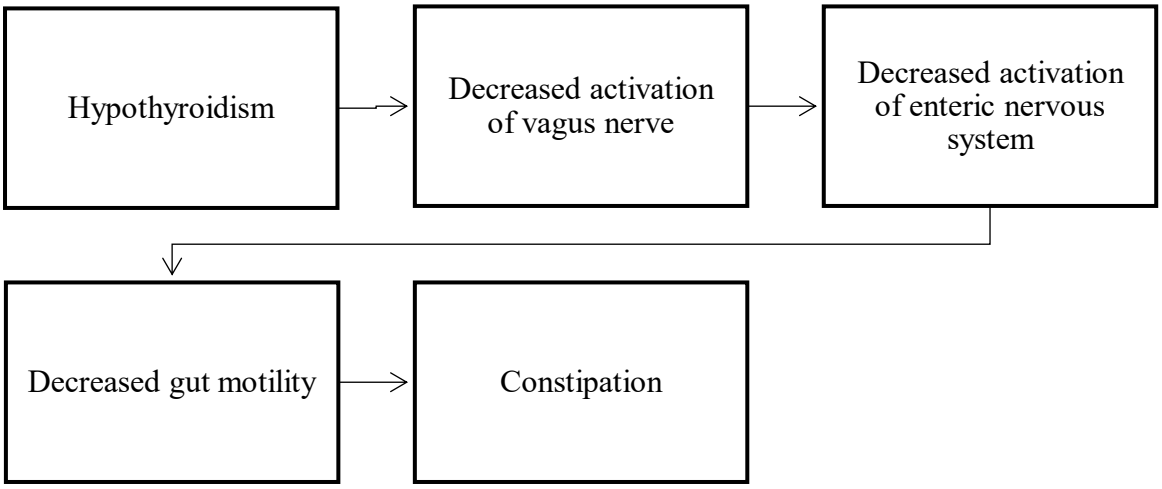


Figure 4: Role of hypothyroidism in constipation.

1.3.5 Mechanical factors

The mechanical changes during pregnancy are also responsible for constipation. In late pregnancy when the uterus is enlarging with the growth of the baby, it started precluding the solid feces by obstructing the intestine which causes the women constipated. Sometimes, intestinal rotation can occur which also causes constipation. Intestinal malrotation is the abnormality of the intestine where the intestine gets twisted which occluded the feces to pass. When the fetus started growing, it also causes the dextrorotation of uterus. During uterine torsion in pregnancy, the uterus rotates of its long axis more than 45 degree clockwise which is called dextrorotation uterus. This rotation sometimes creates obstacle for the gastric transit(Cullen & O'Donoghue, 2007). Pelvic floor dysfunction or pelvic floor injury can be another cause. This basically happens to the postpartum women who have undergone more than one vaginal delivery. The mode of delivery is a risk factor for the pelvis floor dysfunction. The muscles of pelvic floor are the muscles who serve to control the bladder and bowel. Pregnancy & mode of delivery can weaken the pelvic floor muscles. Levator ani

muscle supports the pelvic organ and helps in discharging. Levator ani muscle can be damaged due to vaginal delivery. It's very common in postpartum women. Damages of levator ani muscle leads to dysfunction of the muscle and the consequences are constipation, urinary incontinence etc. Levator ani muscle can be damaged by the weight of gravid uterus and it's increased intrabdominal pressure. Mostly, pubovisceral part is damaged in levator ani injury. In case of repeated pregnancy, this problem occurs more. This is common case in parous women. Parous or parity is the number of how many times a woman has been pregnant and gave birth. Primiparous woman is who gave birth one child or pregnant for the first time. Multiparous woman is women who gave birth more than one child. Multiparous women have more chances of having levator ani muscle injury rather than in primiparous women(Shafik & El-Sibai, 2002). Prolong second stage labor is a factor which contributes in levator ani muscle injury. There are four stages of labor. The first stage of labor is the thinning and opening of cervix, second stage started when the baby proceeds through the birth canal, third stage is afterbirth and the fourth one is recovering period after delivery. Prolongation of the second stage causes the levator injury(Eslamian, Oveisi, Marsoosi, Jamal, & Abotorabi, 2014). Hiatal opening occurs in the second stage of labor(Dietz & Shek, 2008). These prolong stretches of the muscles weaken the levator ani muscle and cause the injury because of this prolong second stage of labor.

1.3.6 Increasing colonic water absorption

During pregnancy a lot of physiologic changes occur. In the pregnancy period, the colonic water absorption increases and may prevail the formation of hard, small, scybalous stools. Water absorption increases day by day because of the hormonal changes in pregnancy. It makes the body dehydrated. Dehydration means losing the water from body(Arnaud, 2003). Aldosterone elevates water absorption in pregnant body, specifically during the second trimester. Aldosterone is the one which is responsible for water removing from body. It

causes urination more frequently and removes water from body through urination. The colons absorb sodium and water in a large amount during pregnancy. Increased sodium intake causes increased aldosterone production in pregnancy(Parry, Shields, & Turnbull, 1970). Progesterone and estrogen remain in increasing amount during pregnancy. They both elevate renin secretion. Renin helps to convert angiotensinogen to angiotensin 1 and then angiotensin 1 is converted to angiotensin 2, and results into expanded aldosterone levels as pregnancy progresses. The renin-angiotensin-aldosterone system is active in third trimester. The renin concentration which is performed active reached to a high value during pregnancy. Comparing to the postpartum during third trimester, the normotensive pregnant women are found with two to three times higher level of active renin concentration.(Langer et al., 1998). Those pregnant women who have no problem of constipation had high rate of water consumption throughout pregnancy. During first trimester, the level of plasma angiotensin-I remained but distinctly during the second trimester and reached highest values during the third trimester of pregnancy. The level of angiotensinogen remained in normal level during the first trimester which increased slowly from the 12th to the 36th week of pregnancy. The absence of detachment of increase in angiotensin-I in the first trimester of normal pregnancy probably reflects more accurately of the first step of the renin-angiotensin-aldosterone system in case of in-vivo efficiently. The detachment between the expansion in angiotensinogen and the expansion in renin suggests that these two parameters are differently regulated(Langer et al., 1998). It is found in a study that non constipated pregnant have high rate of water consumption than the constipated pregnant women and most of them have low rate of water consumption in the first trimester(Derbyshire et al., 2006).

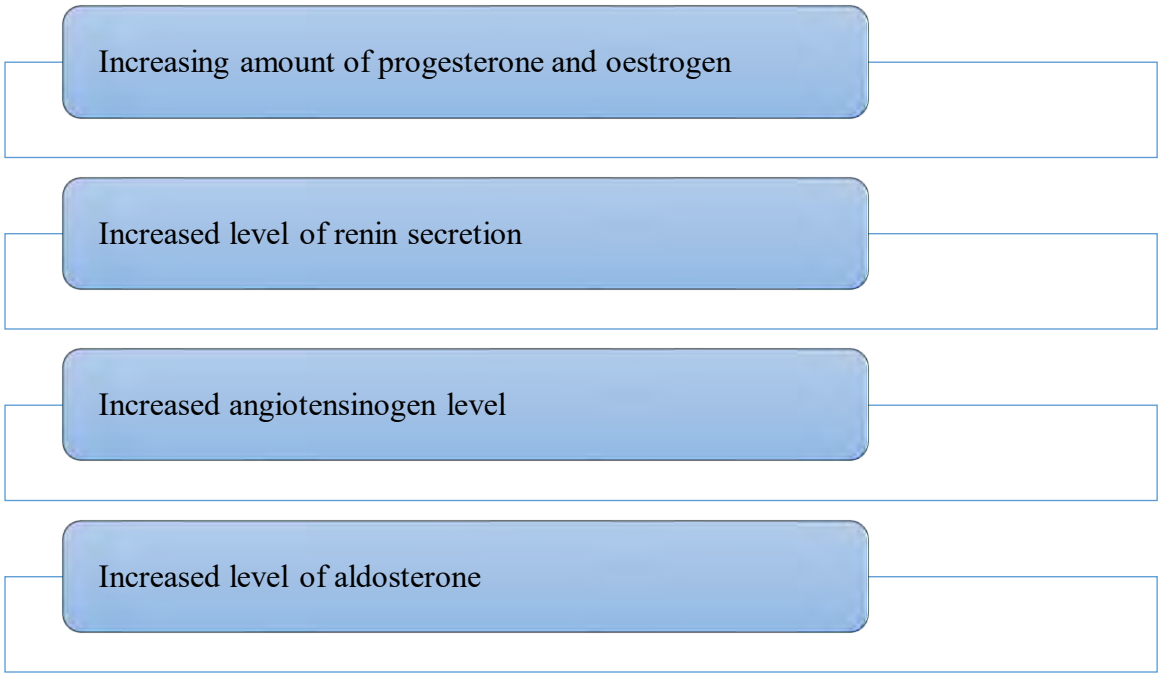


Figure 5: Effect of increased colonic water absorption in constipation.

1.3.7 Iron supplementation

Iron is required for the pregnant women because the body uses iron to produce the blood. So, the body needs extra iron for the development of baby which sometimes can't be filled with iron rich foods. For that reasons most of the doctors suggest the iron supplementation to the pregnant women in 1st trimester to avoid the chances of anemia. Iron supplementation plays a vital role in constipation during pregnancy(Verghese, 2008). It was found in a study that the intake of dietary fiber was lower in late pregnancy in constipated women, but they did not study the consumption of iron supplements(Derbyshire et al., 2006). Iron supplementation is commonly thought to result in gastrointestinal discomforts including constipation but the clinical trial shows different conclusion. It has shown in a randomized clinical trial of four different doses of ferrous fumarate in 404 pregnant women who are healthy but the rates of constipation was not associated with treatment regimen and did not differ between the dose groups during the treatment(Milman, Byg, Bergholt, & Eriksen, 2006). Another study showed that constipation was associated with intake of a prenatal vitamin with a higher dose

of elemental iron compared with one with a lower dose. PregVit® is a supplement which has iron content but lower (35 mg) and calcium content. This supplement claimed that it has significantly less chances of constipation as compared to 60 mg iron- Materna that has similar compliance rates(Ahn et al., 2006). These variations of results might occur only because of different iron formulations used in pregnancy. Folic acid is another reason of this problem. If any pregnant woman is constipated at the same time taking synthetic folic acids, then situation will worse. Natural folic acid is better than synthetic folic acids.

1.3.8 Side effects of medicines

Side-effects of medications can also cause constipation. Many opioids, analgesics, laxative also cause constipation. Long use of laxatives can cause the constipation. Many oral contraceptives also contribute in this. If any women used to take oral contraceptive regularly basis before pregnancy can suffer from constipation. PCO medicines also cause constipation. Anti-Parkinsonian agents (anticholinergic or dopaminergic), tricyclic antidepressants, anti-epileptic drugs, anti-hypertensive agents, iron preparations are some agents which can cause constipation(Tack et al., 2011).

Table 1: List of medicines that causes constipation.

Drugs that causes constipation:
Antacid
Narcotic
Anti-depressant
Laxatives
Diuretics
NSAIDs

1.4 Diagnosis

The Rome criteria are a standard clinical measure that is used in assessing chronic constipation of the patient. It was not formulated by thinking of pregnancy-related constipation. The patients who report symptoms are related with the frequency of stool, difficulty in passing stool and those symptoms which do not comply to strict diagnostic criteria can be evaluated through room-ii criteria. They basically focus on some symptoms such as straining, feeling of incomplete evacuation stools that are excessively hard, unproductive urges. It is therefore possible that a patient may diagnose constipation even when they are having daily bowel motion. If anyone has at least two of the following symptoms, he/she will be considered as a patient suffering from constipation.

Table 2: Room-II criteria(Derbyshire et al., 2006)

Straining to start (>25% defecations)
Straining to finish (>25% defecations)
Lumpy, hard stools
Incomplete evacuation (>25% defecations)
Defecation frequency (<3 defecations per week)

For pregnancy related constipation, clinical evaluation is more preferable. Physical examinations are done by the doctors. Physical examination is based on the symptoms. Moreover, it should be confirmed by the doctors that the patients have any history of other diseases. After assessing the symptoms, the doctor will suggest the diagnostic tests which are safe during pregnancy. CAS is a scoring system which is symptom based and is used for the clinical evaluation of pregnancy related constipation.

Figure 6: Constipation assessment scale

1.4.1 Lab tests

Lab tests should be done to check whether the patient is having any disease which causes constipation.

Blood tests are done to check whether the patient has anemia or hypothyroidism.

Stool test helps to show the symptoms of infection and inflammation

Urine test helps to show the signs of diabetes.

1.4.2 Endoscopy

It has a major diagnostic and therapeutic role in inspection of many disorders of gastrointestinal. Although enough evidence of safety of this test is not found in patients who are pregnant. During pregnancy endoscopy should be avoided because of risks. It can cause some serious harm to the fetus because of premature labor, trauma, hypoxia and teratogenesis. One option can be delaying of endoscopic procedures after delivery(Savas, 2014). If any emergency or urgent situation came like endoscopy cannot delay, in that case the procedures may be considered with some precautions. Endoscopic procedures during pregnancy may include percutaneous endoscopic gastrostomy, enteroscopy of the small bowel or video capsule endoscopy, upper gastrointestinal endoscopy endoscopic retrograde cholangiopancreatography, sigmoidoscopy, colonoscopy, and endoscopic ultrasonography. These procedures should be performed in the hospitals by only expert endoscopists in pregnant patients and an obstetrician should be informed the patient about all the advantages and disadvantages of endoscopic procedures. Some endoscopy like the flexible sigmoidoscopy may be safe for the pregnant women and fetus both but only performed during pregnancy if any strong signs are present otherwise not. Colonoscopy for pregnant patients should be considered for strong evidences during the second trimester. Therapeutic endoscopic retrograde cholangiopancreatography may be considered during pregnancy but all of this procedure should be performed only for strong indications. The attempts should be made to lessen the radiation exposure(Siddiqui & Denise Proctor, 2006).

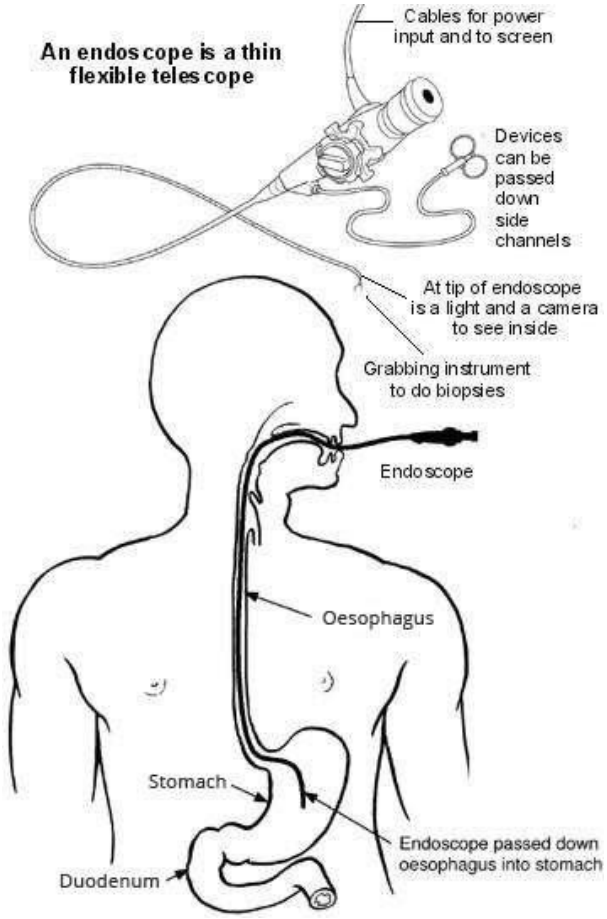


Figure 7: Procedure of endoscopy(Standard, 2019).

1.4.3 Anorectal manometry

This test is used to check whether the anal sphincter works well or not. As we know anal sphincter injury can be seen after delivery, so this test can be done after the baby born. It is safe for the women who have undergone delivery stages(Schizas, Ahmad, Emmanuel, & Williams, 2016). Pregnant women are not allowed for this procedure.

1.4.4 MRI

A good overall topographic display & high inherent soft-tissue contrast is provided in it. It also benefits from lack of ionizing radiation thus making it safe for pregnant patients. MRI has the ability to check the fetus using current short-duration sequences. Fewer reports stated about the investigation of maternal abdominal and pelvic diseases(K.R., M.A., W.B., Z., & R.C., 2005).

1.5 Treatment

Treatment of constipation is very important. Most of the time, the symptoms of constipation are left untreated. There are two types of treatment that the doctors suggest to the patient.

1.5.1 Non-pharmacological

Non-pharmacological treatment is the initial treatment that the physician always suggests for treating constipation in pregnancy. It's wise to take medicine as less as possible during pregnancy because most of the medicines give teratogenic effects which harm the fetus(Clausen & Mortensen, 1997). The first step of treatment is lifestyle changes and dietary modification. This includes lowering excessive body weight, avoiding intake of reflux-triggering foods or substances like fats and foods that are spicy(Tytgat et al., 2003). The patients are suggested to take enough quantity of vegetables and fibers in their meal. Examples of such vegetables are spinach, grains, cucumber etc.(Derbyshire et al., 2006). Adequate intake of water is must for the patient suffering from constipation. Some light exercises during pregnancy are also recommended for the patients because physical inactivity leads in difficulties of bowel movements(Cullen & O'Donoghue, 2007).

1.5.2 Pharmacological

Table 3: Safety of the drugs treating constipation during pregnancy(Camilleri & Locke, 2013)

Drugs	**Safe/Safety/Unsafe**	**Comments**
Laxatives		
Bulk forming agents (Metamucil, perdiem, Citrucel)	Safe	Agents of choice
Hyperosmotic agents (glycerin, Sorbitol, lactulose)	Safe	
Lubricants (Mineral oil, Haley's)	Unsafe	Hypoprothrombinemia with

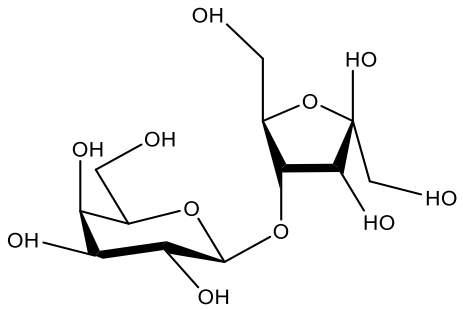
		neonatal bleeding if used regularly
Saline laxatives (Milk of Magnesia, Fleet's)	Safe	Avoid excessive use, may cause electrolyte disturbance, volume overload
Stimulants		
Anthraquinones Senna (Senokot)	Safety	Excreted sometimes in breast milk and may lead to diarrhea in the neonates
Bisacodyl (Dulcolax)	Safe	Avoid bisacodyl-tannex preparations because effects of tannex absorption unknown
Phenolphthalein (Feen-A-Mint)	Safety	Excreted in breast milk with possible colic in newborn
Castor oil (Haley's MO)	Unsafe	May cause premature uterine contractions
Stool Softeners		
Docusate salts (Colace, Surfak)	Safe	

1.5.3 Most used laxatives

1.5.3.1 Lactulose

It’s a non-digestible osmotic laxative. This type of saline laxative is safe but it can produce sodium retention in mother.

Chemical structure:



Brand name:

AVOLAC

Mechanism of action:

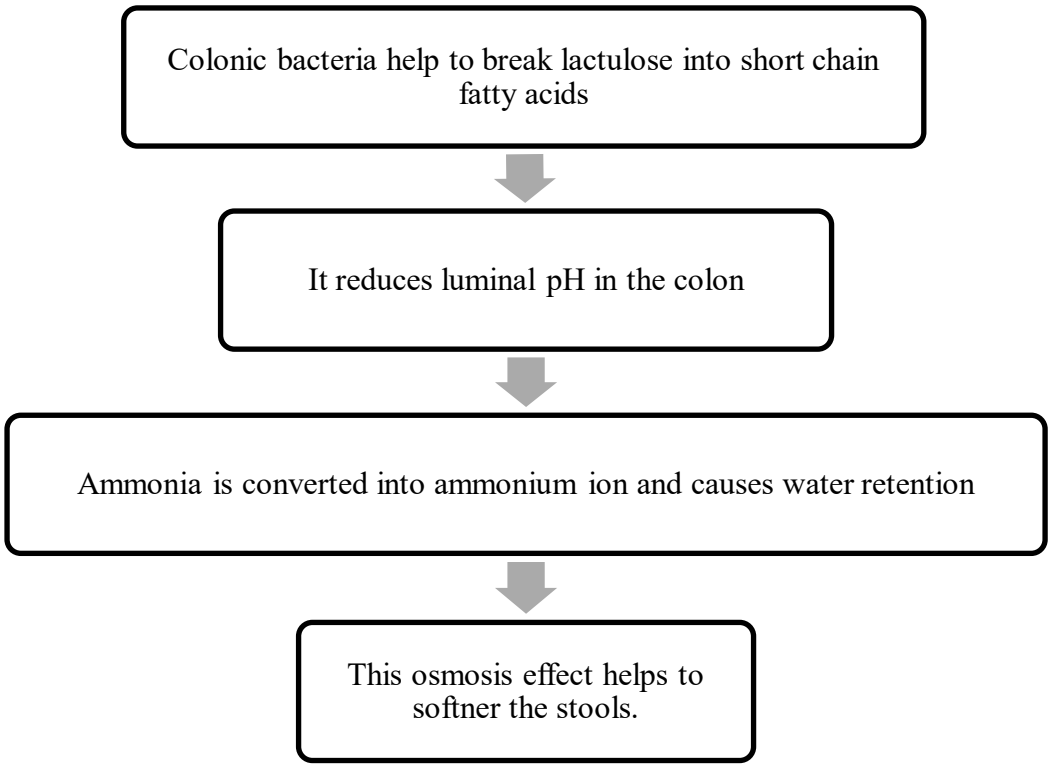


Figure 8: Mechanism of action of lactulose(Clausen & Mortensen, 1997).

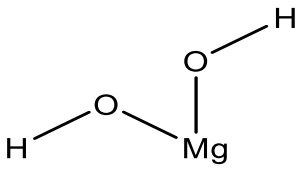
Side effects:

Nausea, gas, abdominal pain, vomiting, diarrhea, electrolyte imbalance due to diarrhea are some of the common side effects of avolac.

1.5.3.2 Magnesium hydroxide

It is an osmotic laxative too.

Chemical structure:



Brand name:

Milk of magnesia

Mechanism of action:

It's mechanism of action is similar to avolac because both of them are osmotic laxative. It causes water retention by osmotic effect and thus soften the stools to come out easily.

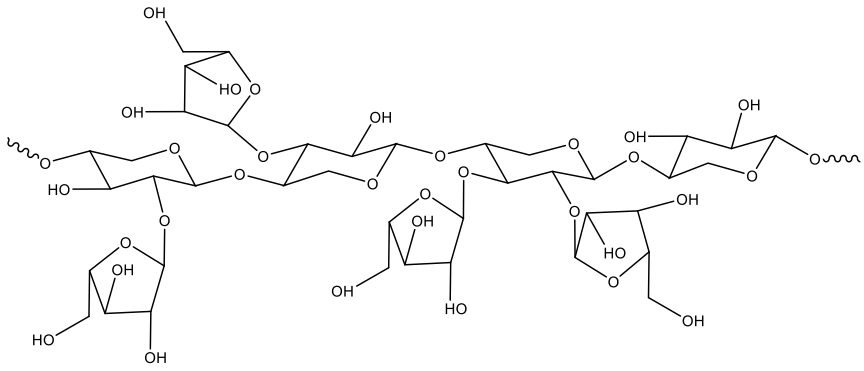
Side effects:

Side effects of milk of magnesia are rare. Sometimes, diarrhea and muscle weakness can be seen after prolong use.

1.5.3.3 Ispaghula husk

It is a bulk forming laxative. They are the safest during pregnancy because they contain fiber. They act as natural fiber. Ispaghula husk consuming doesn't cause systemic absorption.

Chemical structure:



Mechanism of action:

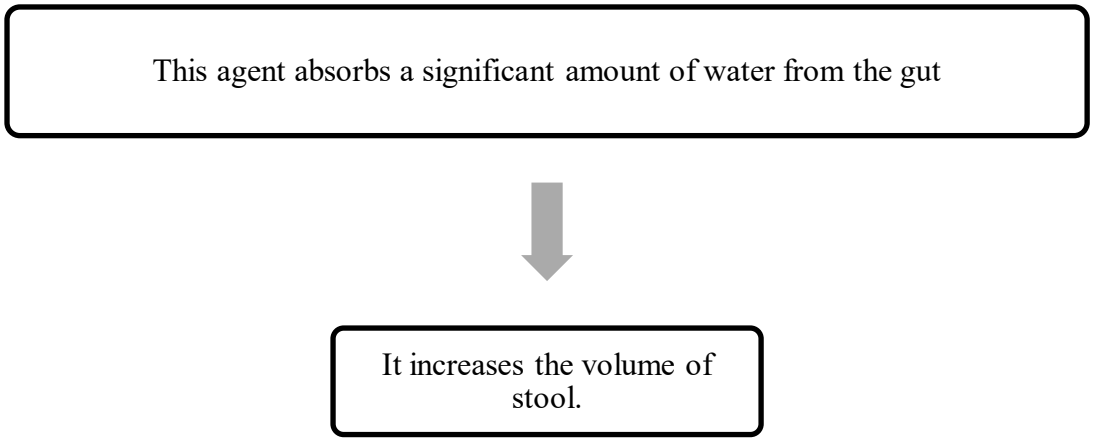


Figure 9: Mechanism of action of ispaghula husk(Dettmar & Sykes, 2010).

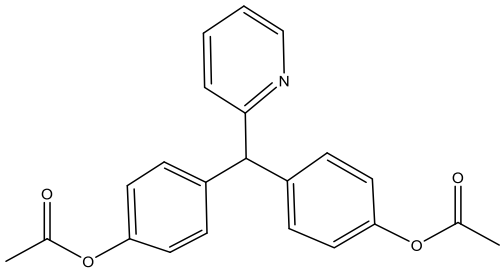
Side effects:

Flatulence, bloating and swelling of the abdomen are the common side effects of ispaghula husk.

1.5.3.4 Bisacodyl

It's a stimulant laxative.

Chemical structure:



Brand name:

- DULCOLAX
- DURALAX

Mechanism of action:

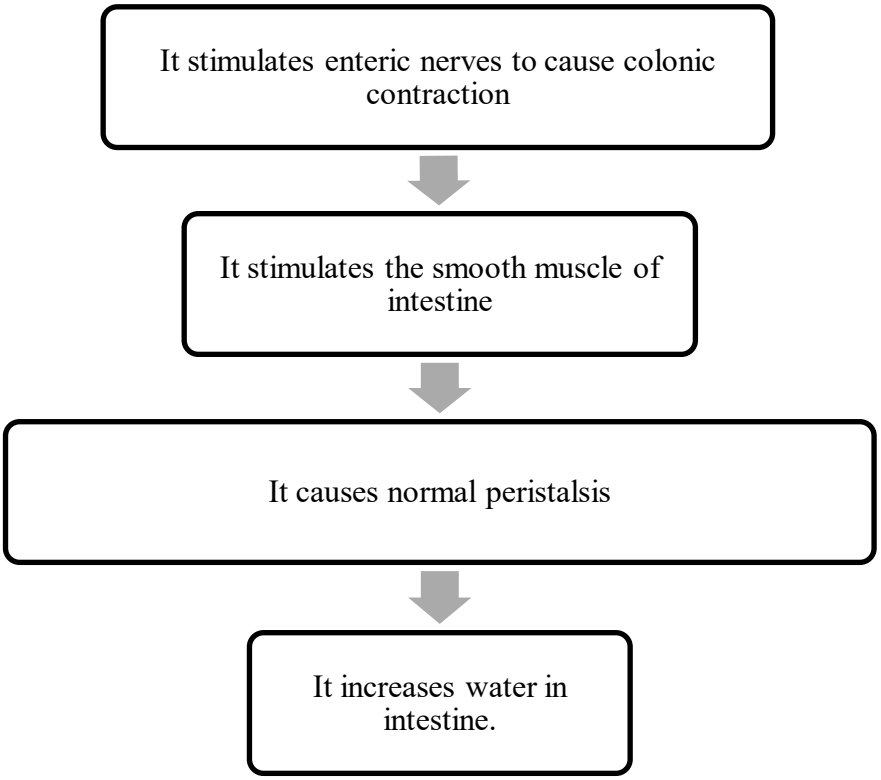


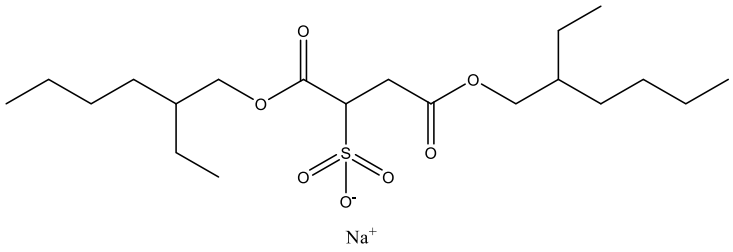
Figure 10: Mechanism of action of bisacodyl(Ratnaike & Jones, 1998).

Side effects:

The side effects of bisacodyl are electrolyte and fluid imbalance, excessive diarrhea, abdominal cramping, rectal burning, spinning sensation (vertigo), stomach/abdominal pain, vomiting, weakness, nausea.

1.5.3.5 Docusate salt

Chemical structure:



Brand name:

DOCUSET

Mechanism of action:

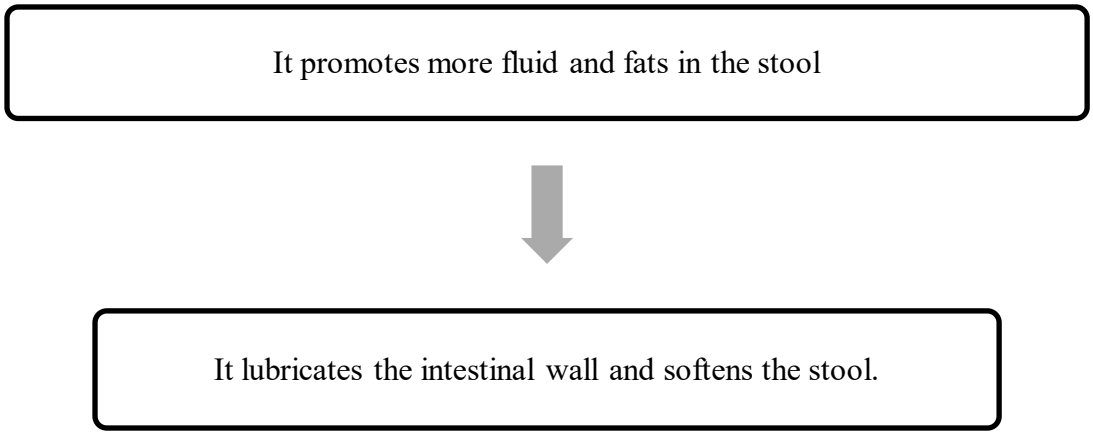


Figure 11: Mechanism of action of docusate salts(Elliot, Watts, & Girard, 1983).

Side effects:

Mild side effects of docusate salts are stomach pain, diarrhea, or cramping. Severe side effects are rare.

1.6 Management of constipation treatment guideline during pregnancy

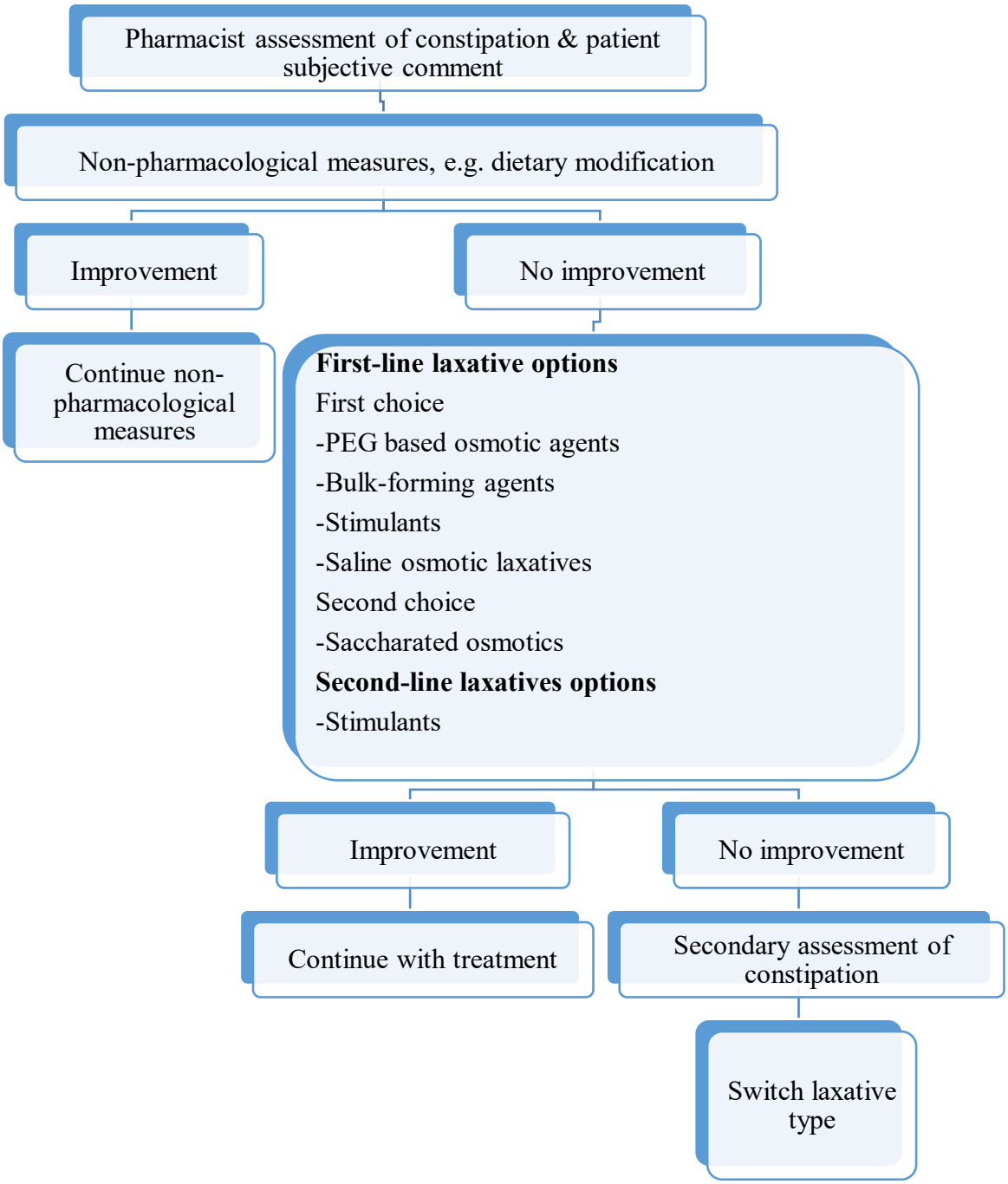


Figure 12: Guideline of treatment of constipation(Tytgat et al., 2003).

Chapter 2

Methodology

2.1 Research goals and objective

The goal of this study was to establish the current scenario of constipation in Bangladeshi pregnant women and investigate the possible underlying causes and possible treatments of it. Therefore, the main objectives of the research were to compare the severity of constipation between primiparous & multiparous women and figure out the existence of it in different trimesters during pregnancy in Bangladeshi pregnant women.

2.2 Research design and method

A literature search was conducted first to collect required information about constipation during pregnancy. Then, the design of the study was accordingly done along with other necessary steps. The following subsequent flowchart illustrates the entire methodology of this research.

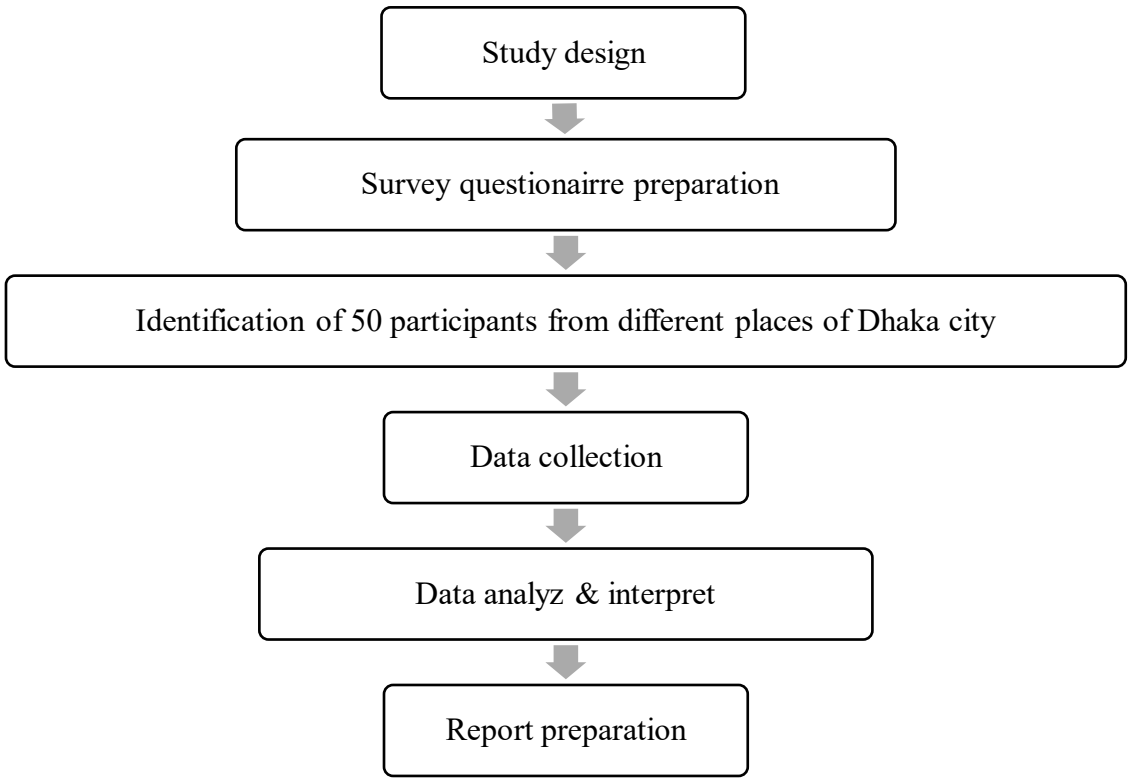


Figure 13: Overview methodology of the study.

2.2.1 Study design

The first approach of this research was a cross sectional study which determines the intensity of constipation among primiparous and multiparous women of Bangladesh, compare their pregnancy stages or trimesters and age groups and interpret the following treatment.

2.2.2 Survey questionnaire preparation

After designing the study, two questionnaires were selected for this research purpose. One of them questionnaire was being used globally for screening constipation (CAS) and another one was developed following the collected information related to constipation in pregnancy.

CAS is a self-report measure designed to evaluate the presence and severity of constipation in pregnancy. This is a 8-item self-assessing scale which precisely schemed to screen the constipation in pregnancy(Broussard, n.d.). Each and every item has been assigned a score of 5-point scale (from 0 to 4) with a maximum score of 32. The total scores are divided into four

categories based on scores where 0-8 score indicating no problem to minimal, 9-16 indicating some problem, 17-26 specifying some to moderately severe problem and 25-32 demonstrating moderately severe to severe problem with constipation during pregnancy. The questions consists of the relevant answers about “abdominal distension or bloating,” “change in amount of gas passed rectally,” “less frequent bowel movement,” “oozing liquid stool,” “rectal fullness or pressure,” “rectal pain with bowel movement,” “small volume of stool,’’ and being “unable to pass stool”. The answers are ranging from no problem to severe problem.

Another questionnaire was a 17-item questionnaire with few sub sections which includes participant’s information about their trimesters, age group, BMI, lifestyle, medications, and educational background as well. This was taken to provide the actual scenario of this problem. The pregnant women who scored more than 8 in the previous questionnaire, was selected for the second stage or for second questionnaire. A sample of survey questionnaire is given below:

Part -1: Constipation assessment scale

1. Any abdominal pain or bloating? (Rate in following options)

0	1	2	3	4

2. Do you feel any changes in amount of gas passed rectally? (0 is no, 1 is slight changes, 2 is normal, 3 is more than normal, 4 is severe)

0	1	2	3	4

3. Less frequency of stool? (Rate in following options)

0	1	2	3	4

4. Small volume of stool? (Rate in following options)

0	1	2	3	4

5. Unable in passing stool? (Rate in following options)

0	1	2	3	4

6. Oozing liquid stool? (Rate in following options)

0	1	2	3	4

7. Feeling of rectal fullness or pressure? (Rate in following options)

0	1	2	3	4

8. Rectal pain during passing stool? (Rate in following options)

0	1	2	3	4

Part-2

1. In which trimester did you start suffering from constipation?
   - 1st
   - 2nd
   - 3rd
2. What is your age?
   - 16-20
   - 21-25
   - 25-30
   - 30 above
3. Is it your first baby?
   - Yes
   - No
4. What is Your BMI (weight/height)?

   _____
5. Do your constipation started after taking iron supplement?
   - Yes
   - No
6. Name of your folic acid

   _____
7. Do you suffer from hypothyroidism?
   - Yes
   - No

8. Do you take any anti-depressants?
    - Yes
    - No
9. Which of the following things did your doctors suggest after knowing you are suffering from constipation?
    - Diet changes/lifestyle changes
    - Drugs (Laxative)
10. Name of the drugs (Laxative)

    _____

11. Do you take any other medicine or antibiotics?
    - Yes
    - No
12. After the baby born do you still have constipation? (answer this only if you have delivered the baby)
    - Yes
    - No

13. What is your educational level?
    - School
    - Collage
14. Do you walk?
    - Daily
    - Once in a week
    - Twice/thrice in a week
15. Do you eat vegetables in your meal?
    - Yes
    - No
16. In which following criteria are you in?
    - High risk pregnancy
    - Low risk pregnancy
17. What is your occupation?
    - Housewife
    - Working women

2.2.3 Identification of participants and pre-testing

This study is not only conducted by the pregnant women but also the doctors. When the questionnaires were ready, 10 participants of mention category were identified to assess first for the pre-testing. After that their valuable suggestions were recorded to modify the questionnaire. Before finalizing the questionnaire, it was reviewed multiple times to make it

perfect.

2.2.4 Data collection

Pre-testing and modification process of questionnaire was followed by the data collection. Total 50 participants were assessed after giving proper instructions. The participants were ensured that their shared information would be used for research purpose only. The pregnant women were given the CAS questionnaire first and after calculating the scores, pregnant women scoring 8 or more than 8 were given the second questionnaire to fill-up. After completion of filling up the questionnaires, 6 of the participants were eliminated for containing errors. Then, the rest of the questionnaires were forwarded for data analysis.

2.2.5 Data analyzing

The collected data was then divided according to their score groups and analyzed using Microsoft Excel 2019.

Chapter 3

Results

3.1 Categorizations based on Constipation Assessment Scale score

After evaluating the Constipation Assessment Scale quiz, 12% of 50 women participants had no problem to minimum problem of constipation. Moreover, 20% of them had some problem of constipation. Besides, 56% and 12% of women had been found to deal with some to moderately problem and moderately to severe problem of constipation respectively.

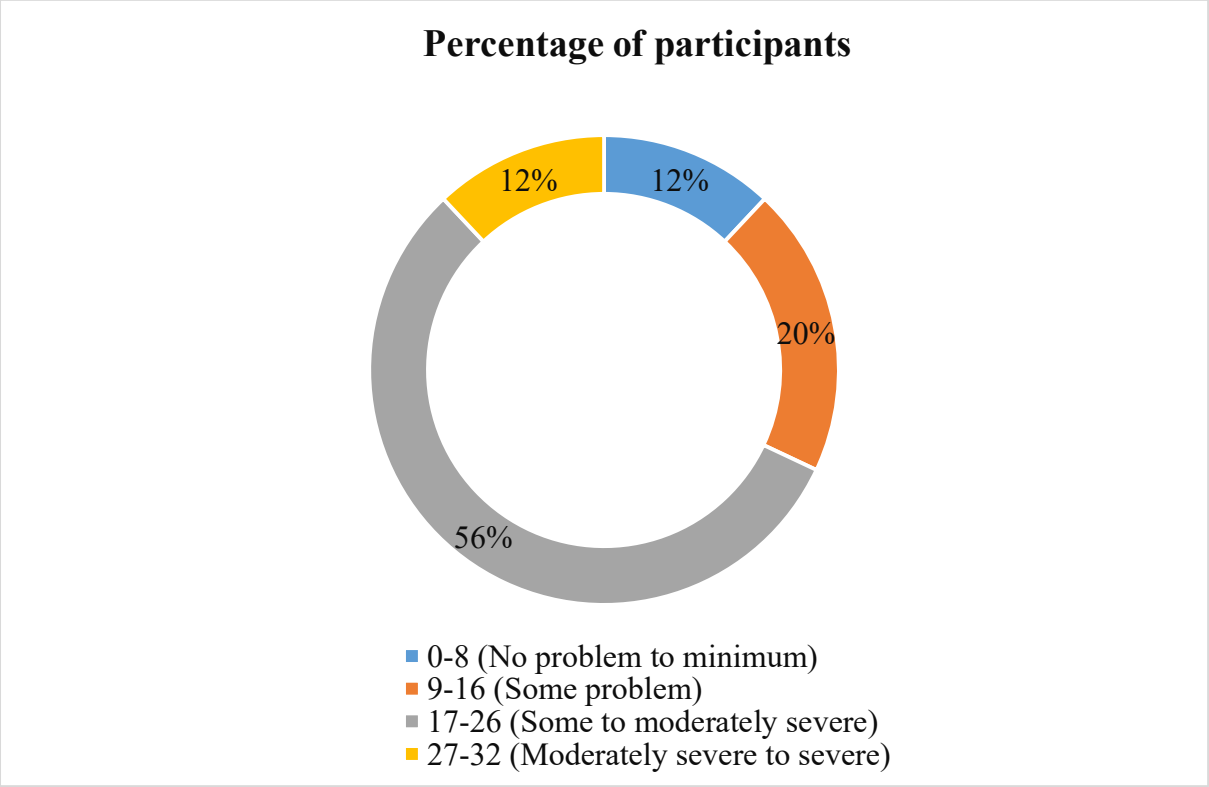


Figure 14: Percentages of participants according to CAS score.

Table 4: Amounts of participants in numbers & percentages according to CAS score.

CAS score	Options	Number of participants	Percentages of participants
0-8	No problem to minimum	6	12%
9-16	Some problem	10	20%
17-26	Some to moderately severe	28	56%
27-32	Moderately severe to severe	6	12%

3.1.1 Abdominal distension or bloating

Among the 44 participants, 20.45% of women had no problem of abdominal distension or bloating. They might have other symptoms but not the abdominal distension or bloating. 11.36% of women had very mild abdominal distension or bloating which cannot be count sometimes. Moreover, 20.45% of women experienced abdominal distension more than mild. 25% and 22.73% of women had severe and more than severe abdominal distension or bloating respectively.

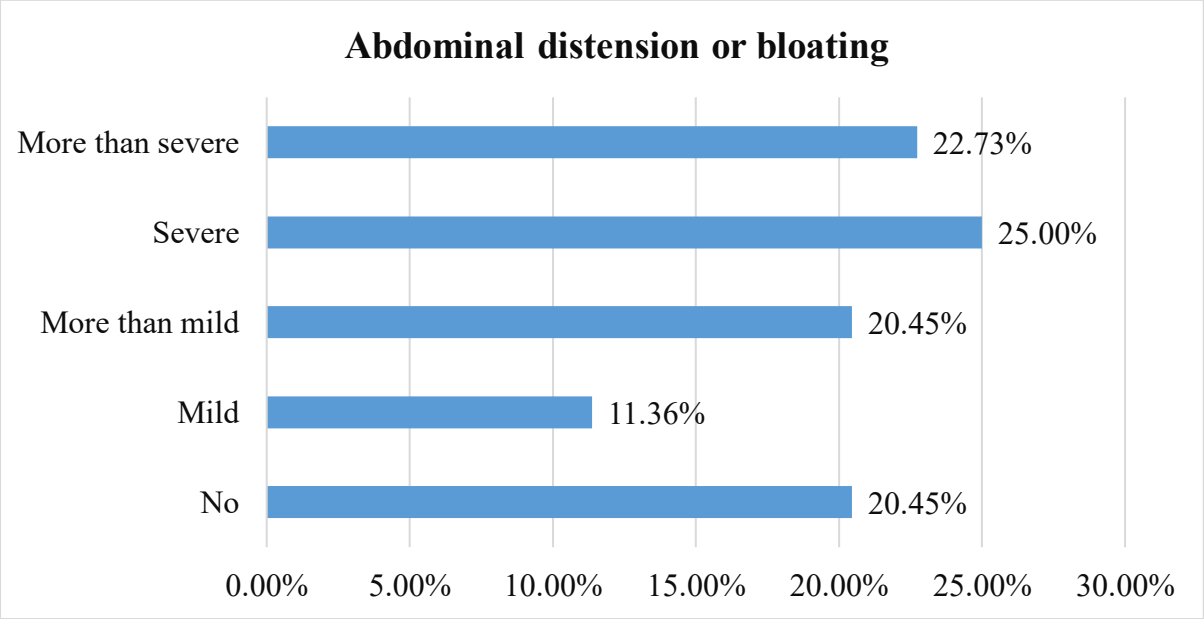


Figure 15: Participant's responses about abdominal distension or bloating.

Table 5: Participants responses in numbers & percentages about abdominal distension or bloating.

Rating	**Abdominal distension or bloating**	**Number of participants**	**Percentages of participants**
0	No	9	20.45%
1	Mild	5	11.36%
2	More than mild	9	20.45%
3	Severe	11	25.00%
4	More than severe	10	22.73%

3.1.2 Changed in amount of gas passed rectally

An amount of 4.55% of women had no changes in amount of gases passed rectally. They don't feel any changes in amount of gas passed rectally. 20.45% of women experienced very mild changes in amount of passing gas. 22.73% of pregnant women had more than mild problem in case of gas passed rectally. Moreover, 29.55% and 22.73% of pregnant women suffered moderately to severe and severe problem respectively in amount of gas changed rectally.

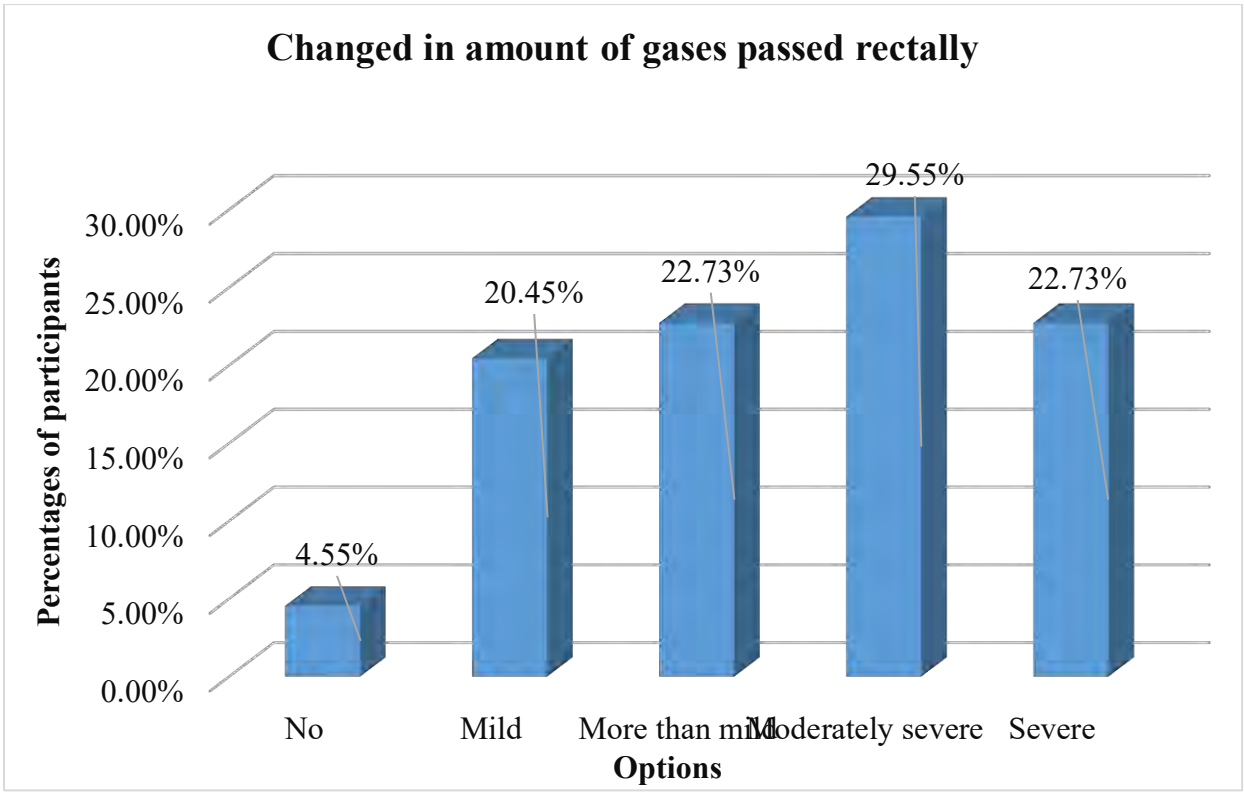


Figure 16: Participant's responses about changing in amount of gases passed rectally.

Table 6: Participant's responses in number & about changing in amount of gases passed rectally.

Rating	Change in amount of gas passed rectally	Number of participants	Percentages of participants
0	No	2	4.55%
1	Mild	9	20.45%
2	More than mild	10	22.73%
3	Moderately severe	13	29.55%
4	Severe	10	22.73%

3.1.3 Less frequent bowel movement

During pregnancy most of the women suffered from constipation experienced very less frequency in stool passing. 6.82% of participants had not experienced less frequent bowel movement. 4.55% of women had mild problem of less frequency of bowel movement. 29.55% of women had more than mild problem in less frequent bowel movement. 36.36% and 22.73% pregnant women had moderately severe and severe problem of less frequent bowel movement.

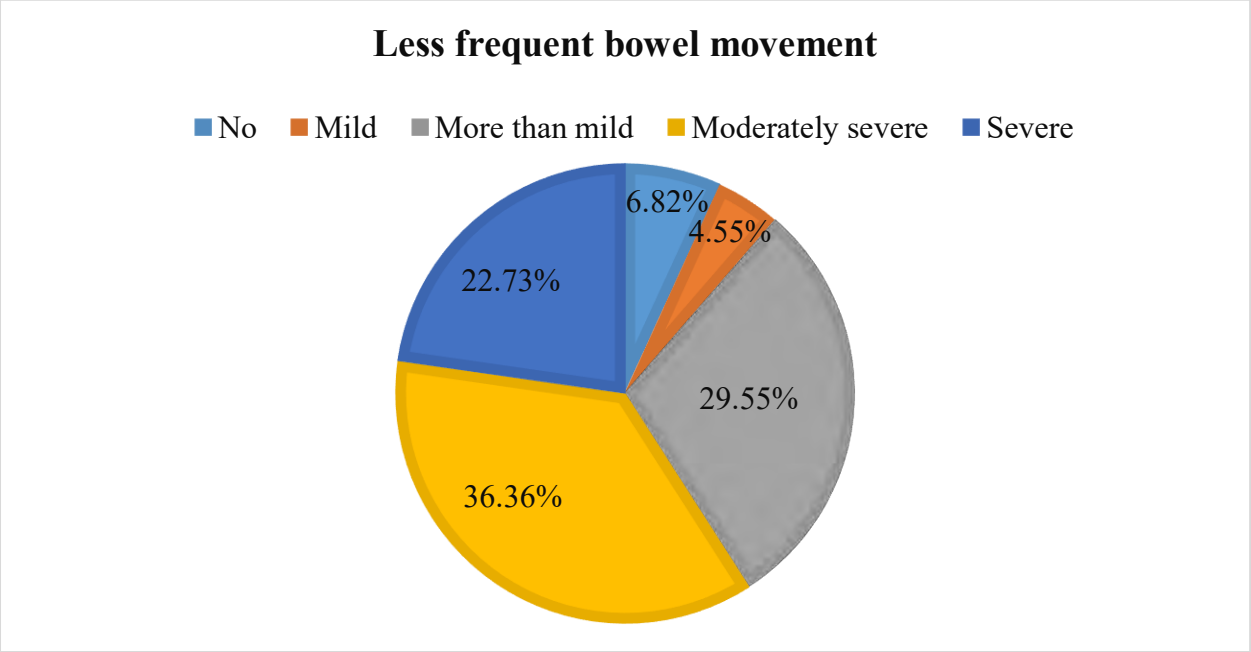


Figure 17: Participant's responses about less frequent bowel movement.

Table 7: Participant's responses in numbers & percentages about less frequent bowel movement.

Rating	**Less frequent bowel movement**	**Number of participants**	**Percentages of participants**
0	No	3	6.82%
1	Mild	2	4.55%
2	More than mild	13	29.55%
3	Moderately severe	10	36.36%
4	Severe	16	22.73%

3.1.4 Oozing liquid stool

Constipated pregnant are often seen to complain about oozing liquid stool. 25% of 44 participants said they had no problem of oozing liquid stool. 9.09% of pregnant women said that they faced this symptom but very mild. 27.27% of pregnant women said that they suffered from oozing liquid stool more than mild. On the other hand, 22.73% of pregnant women had moderately severe problem of oozing liquid stool and 15.91% of women had severe problem of oozing liquid stool.

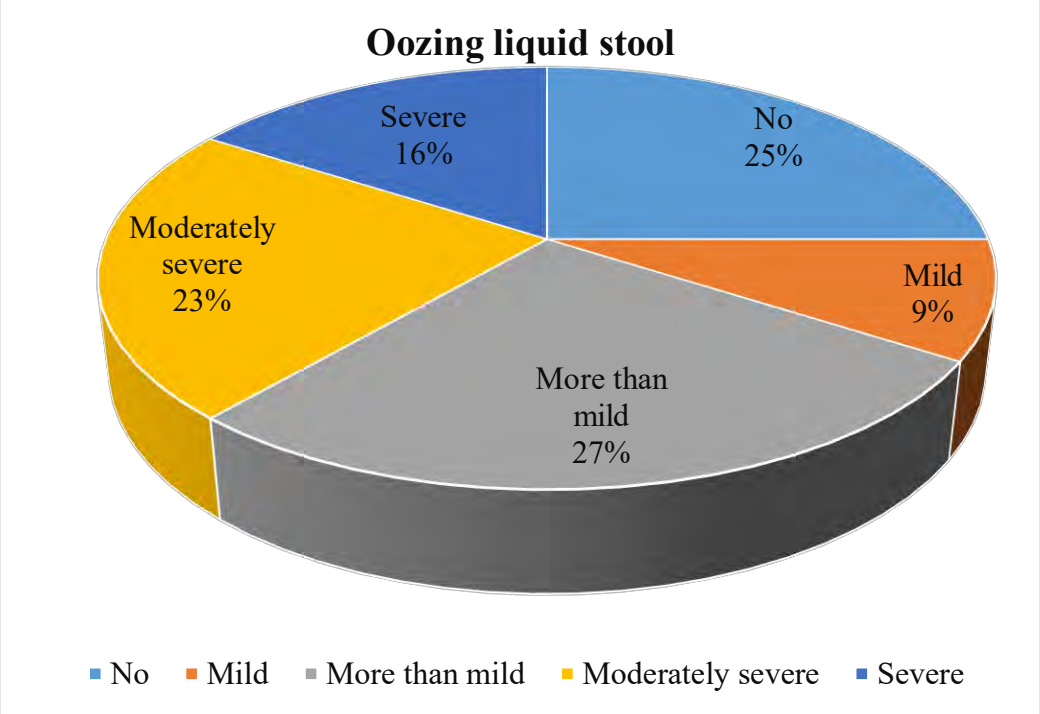


Figure 18: Participant's responses about oozing liquid stool.

Table 8: Participant's responses in numbers & percentages about oozing liquid stool.

Rating	Oozing liquid stool	Number of participants	Percentages of participants
0	No	11	25%
1	Mild	4	9.09%
2	More than mild	12	27.27%
3	Moderately severe	10	22.73%
4	Severe	7	15.91%

3.1.5 Rectal fullness or pressure

Most of the constipated pregnant women feel rectal fullness or pressure. During constipation, the stool become hard and dry which increases the feelings of pressure in the rectum? In this study, 13.64% of pregnant women said they didn't feel any rectal fullness or pressure. Among 44 participants, 13.64% said that they felt mild rectal fullness or pressure during their

pregnancy. 22.73% of women had more than mild rectal fullness or pressure. Moreover, 40.91% and 9.09% of women said that they had experienced moderately severe and severe rectal fullness during their pregnancy period.

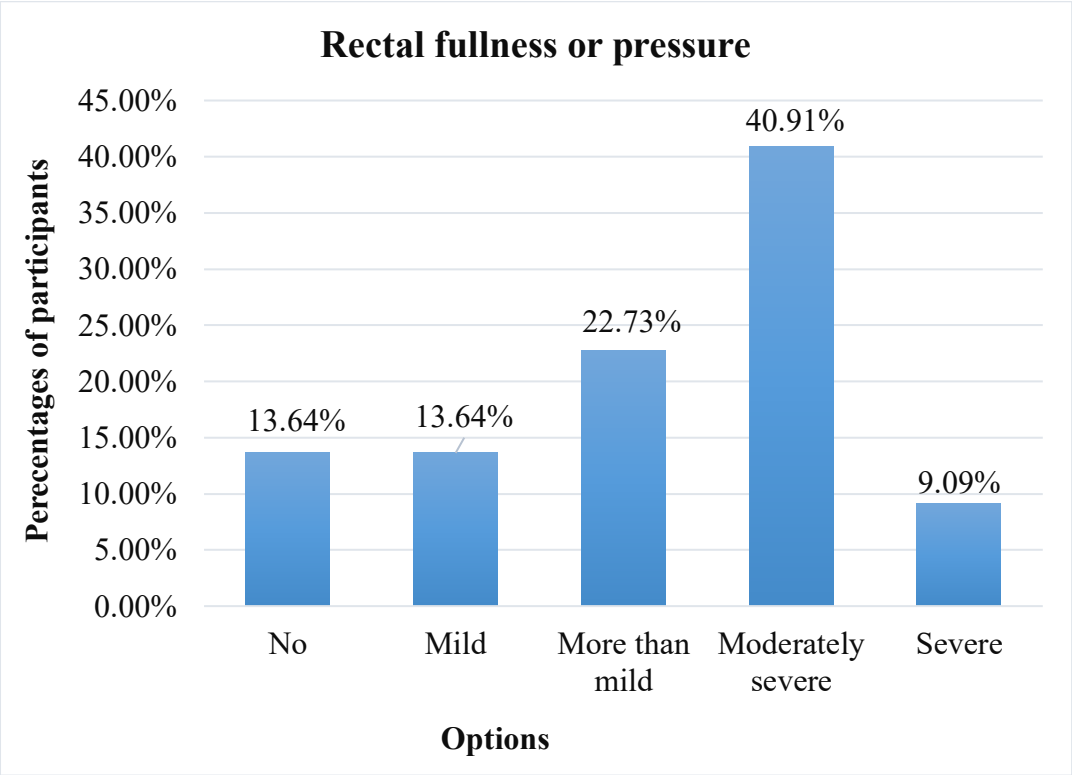


Figure 19: Participant's responses about rectal fullness or pressure.

Table 9: Participant's responses in numbers & percentages about rectal fullness or pressure.

Rating	Rectal fullness or pressure	Number of participants	Percentages of participants
0	No	6	13.64%
1	Mild	6	13.64%
2	More than mild	10	22.73%
3	Moderately severe	18	40.91%
4	Severe	4	9.09%

3.1.6 Rectal pain with bowel movement

During the bowel movement, rectal pain or discomfort is seen among the constipated pregnant women. 6.82% of pregnant women among 44 participants do not feel any pain in rectal during bowel movement. 13.64% of women said that they felt mild pain in rectal during the bowel movement. 36.36% of pregnant women had faced rectal pain more than mild during bowel movement. Moreover, 29.55% of pregnant women had claimed moderately severe rectal pain and 13.64% of pregnant women had severe rectal pain during bowel movement.

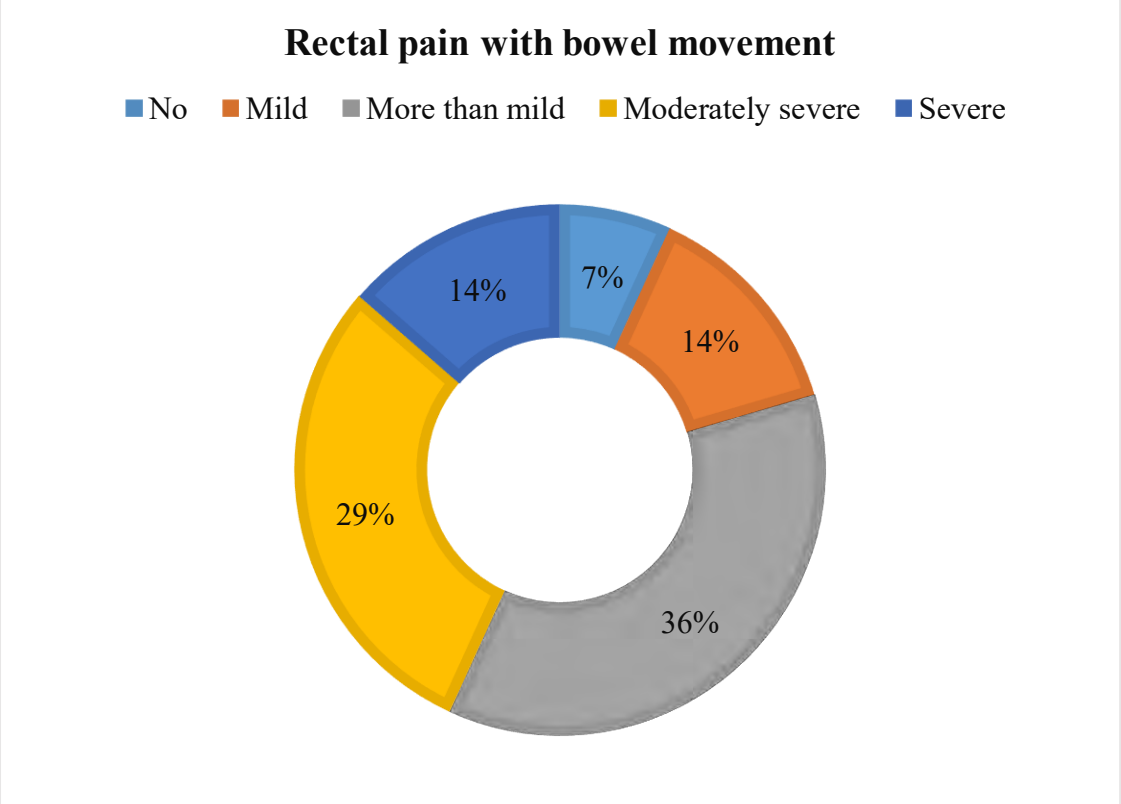


Figure 20: Participant's responses about rectal pain with bowel movement.

Table 10: Participant's responses in numbers & percentages about rectal pain with bowel movement.

Rating	**Rectal pain with bowel movement**	**Number of participants**	**Percentages of participants**
0	No	3	6.82%
1	Mild	6	13.64%
2	More than mild	16	36.36%
3	Moderately severe	13	29.55%
4	Severe	6	13.64%

3.1.7 Small volume of stool

The stools passed during constipation are generally hard in consistency. So, the volume of stool is often seen small in constipated pregnant women. In our study, we didn't find anyone who had not experienced small volume of stool. Among the participants, 2.27% and 20.45% of pregnant women had experienced respectively mild and more than mild small volume of stool. 18.18% of pregnant women had moderately severe small volume of stool. Furthermore, 59.09% of women had claimed that they had severe problem of small volume stool.

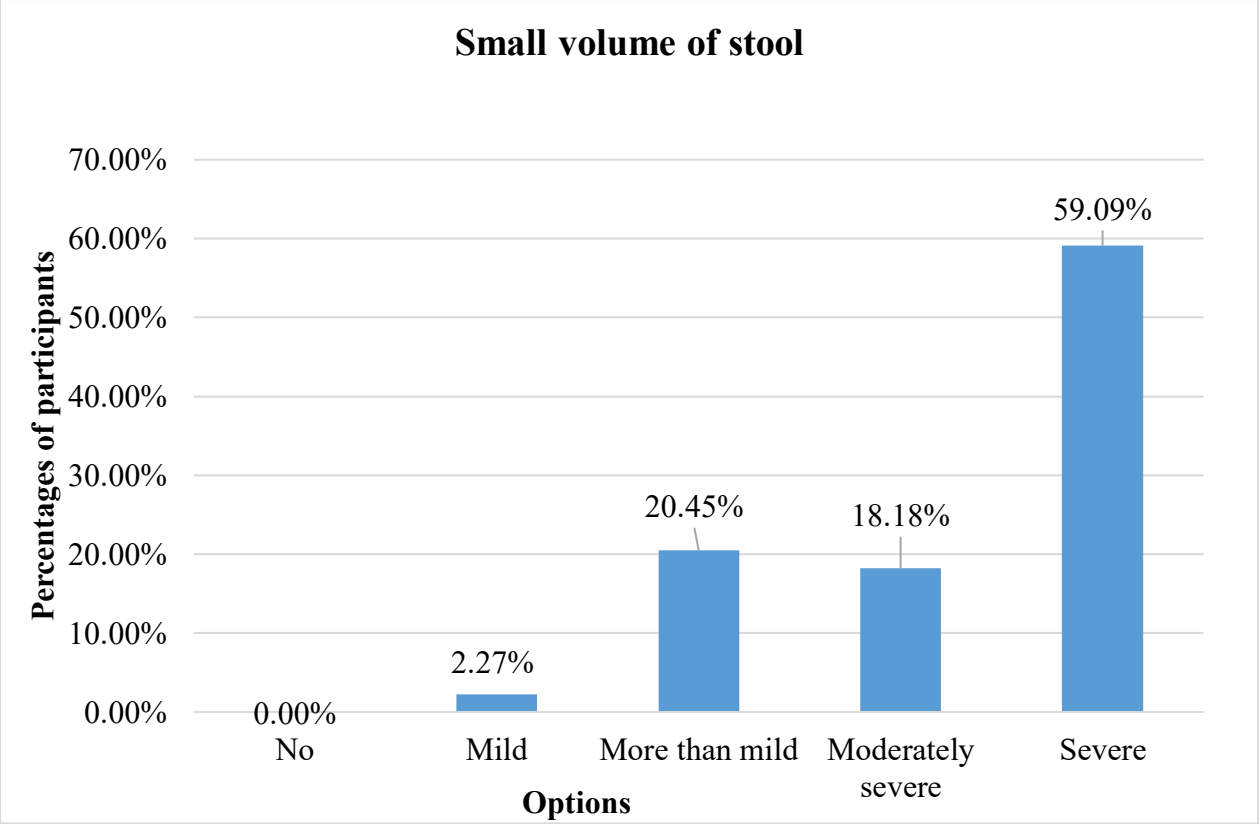


Figure 21: Participants responses about small volume of stool.

Table 11: Participants responses in numbers & percentages about small volume of stool.

Rating	**Small volume of stool**	**Number of participants**	**Percentages of participants**
0	No	0	0.00%
1	Mild	1	2.27%
2	More than mild	9	20.45%
3	Moderately severe	8	18.18%
4	Severe	26	59.09%

3.1.8 Unable to pass stool

The most common symptom of constipated pregnant women is to unable of passing stool. No participants were found who had not experienced this symptom. 22.73% of women had answered the question that they had mild problem in passing stool. 18.18% of pregnant women had more than mild problem in passing stool. However, 59.09% participants had experienced moderately severe problem of passing stool and there were no women in this study who had suffered from severe problem of passing stool.

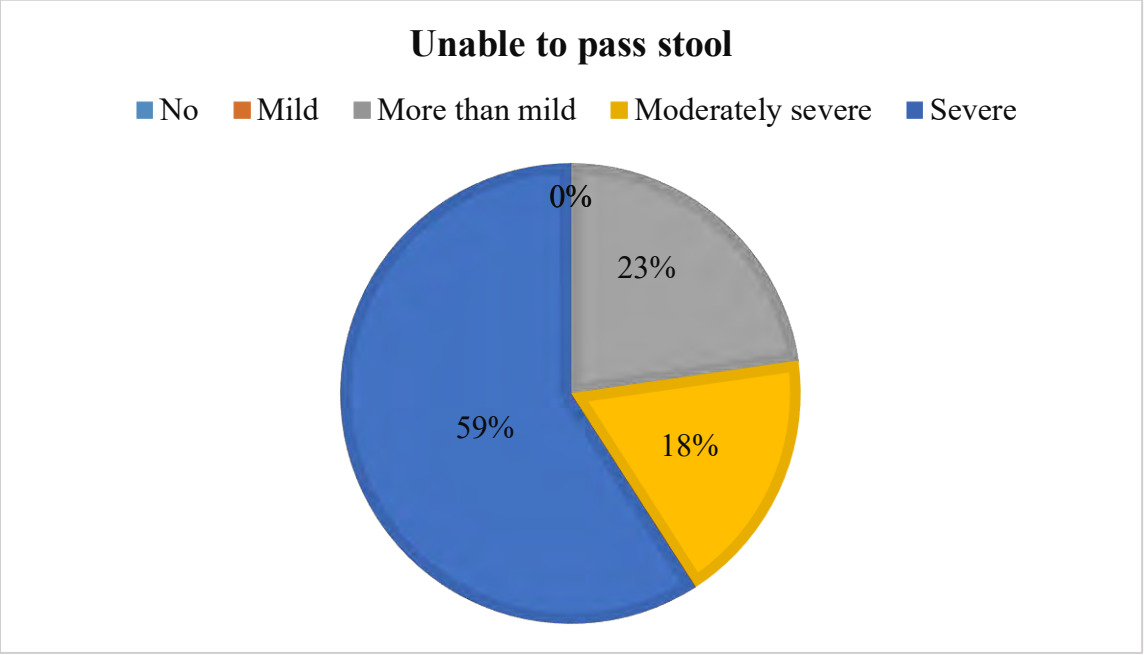


Figure 22: Participant's responses about unable to pass stool.

Table 12: Participant's responses in numbers & percentages about unable to pass stool.

Rating	**Unable to pass stool**	**Number of participants**	**Percentages of participants**
0	No	0	0.00%
1	Mild	0	0.00%
2	More than mild	10	22.73%
3	Moderately severe	8	18.18%
4	Severe	26	59.09%

3.2 Determination and severity of constipation during pregnancy in Bangladeshi women

Maximum women suffer from constipation during their pregnancy period. Bangladeshi women are not different from that. Sedentary lifestyle and pregnancy related changes are mainly responsible for this problem.

3.2.1 Constipation before pregnancy or constipation during pregnancy

Some may have constipation problem before pregnancy or chronic constipation problem. So, we asked the participants whether they experience this problem after pregnancy or before pregnancy. 13.64% of participants out of 44 participants claimed that they had constipation before pregnancy which became worse during pregnancy and rest of the 86.36% of participants had constipation after pregnancy.

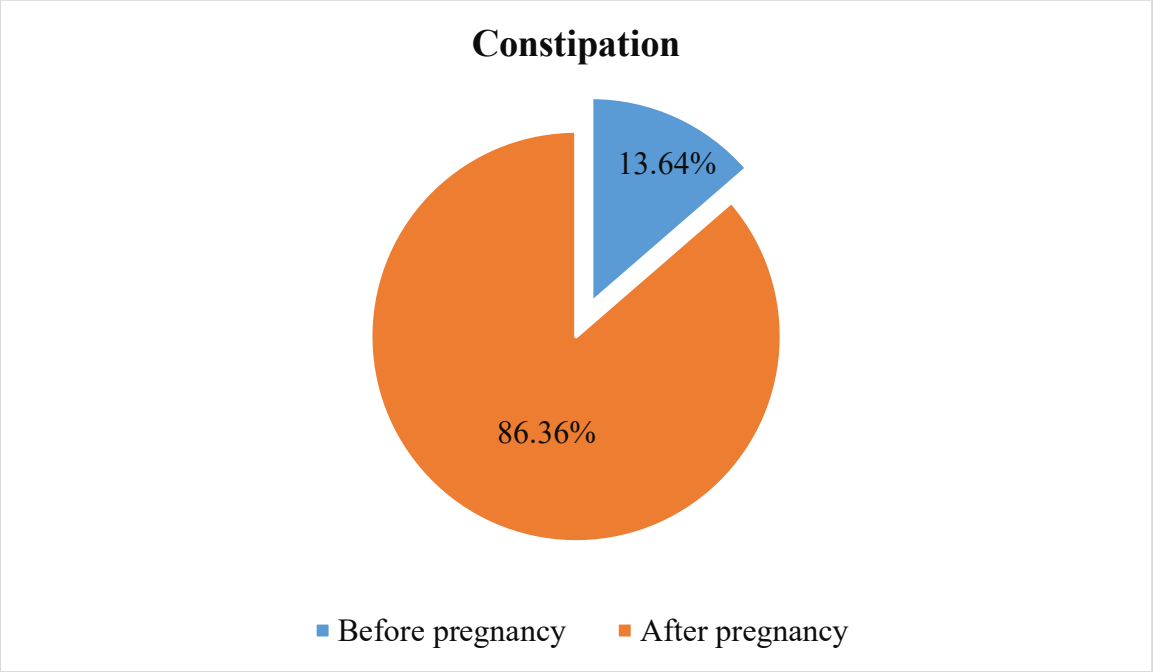


Figure 23: Participant's responses about their timeline of constipation.

Table 13: Participant's responses in numbers & percentages about their timeline of constipation.

Constipation	Number of participants	Percentages of participants
Before pregnancy	6	13.64%
After pregnancy	38	86.36%

3.2.2 Constipation in different trimesters of pregnancy

Constipation can start in different stages of pregnancy. Some pregnant women face this problem in the first trimester. Some may experience this in their 2nd or 3rd trimester. This may vary to different causes. In this study, we have observed the severity of this problem among different stages. In addition to, this problem may happen in postpartum cases too. In our study, we found 45.45% of pregnant women who were suffered from constipation in their 1st trimester. On the other hand, this number had reduced in case of 2nd trimester and around 18.18% of women had suffered from this in their 2nd trimester. Furthermore, 27.27% of women had constipation in the 3rd trimester of their pregnancy period.

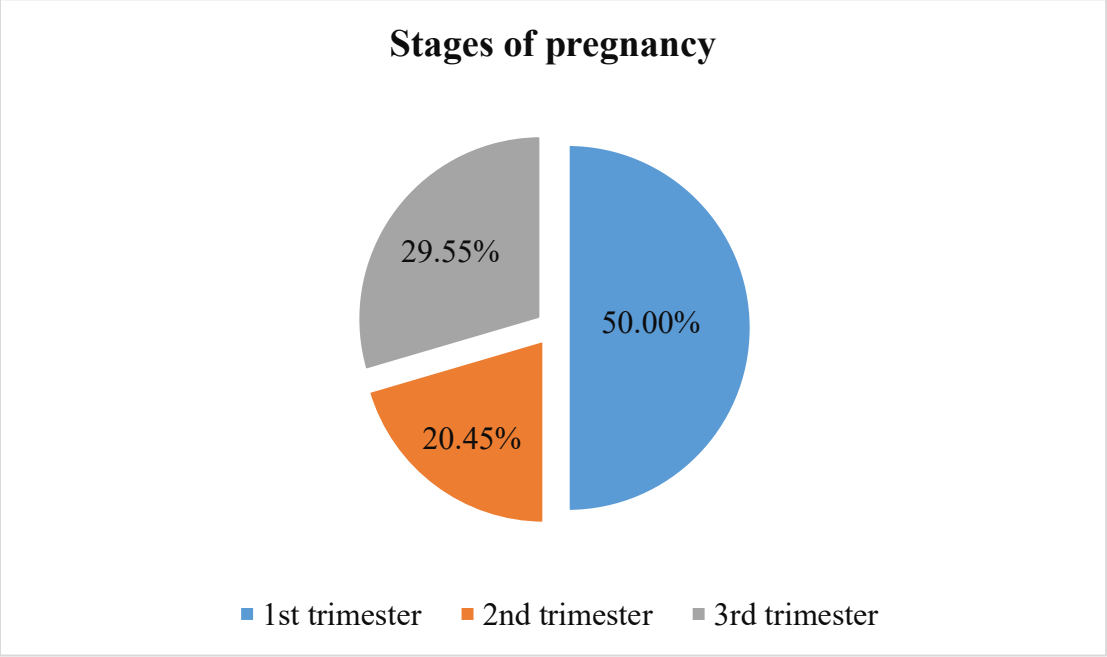


Figure 24: Participant's responses about constipation in their different stages of pregnancy.

Table 14: Participant's responses in numbers & percentages in their different stages of pregnancy.

Trimesters	Number of participants	Percentages of participants
1st trimester	22	50.00%
2nd trimester	9	20.45%
3rd trimester	13	29.55%

3.2.3 Constipation started after taking iron supplementation

We had asked the participants whether their constipation problem started just after starting of iron supplements. 68.18% of women had responded to yes and 31.82% of women had responded to no.

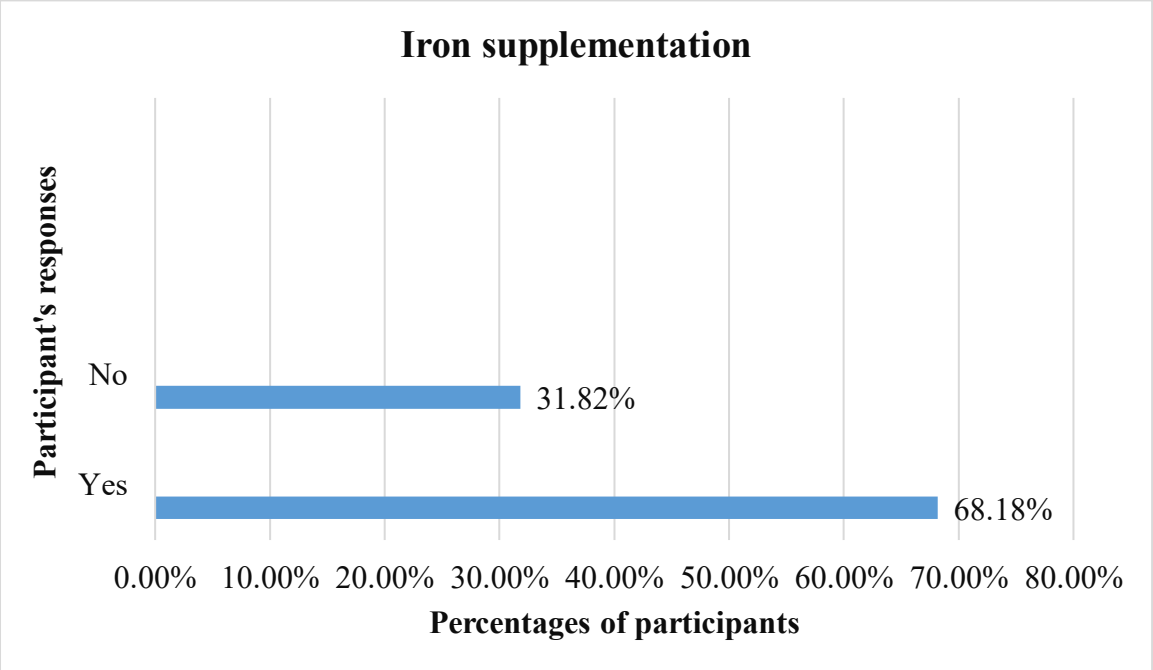


Figure 25: Participant's responses about taking iron supplements.

Table 15: Participant's responses in numbers & percentages about taking iron supplements.

Iron supplementation	**Number of participants**	**Percentages of participants**
Yes	30	68.18%
No	14	31.82%

3.2.4 Lifestyle changes bowel movement during pregnancy

Lifestyle habit plays a major role in causing constipation. Many women do not take enough fibers in their meal or plenty of water which causes this situation. Some of them are not active physically which aggravates this situation more. In that case, only lifestyle modification will work for treating constipation. For finding the probable causes of constipation, we have also asked the participants about their lifestyle mainly the water drinking habit, vegetables in their meal and walking habit per day.

3.2.4.1 Water drinking routine

We asked the participants about their water drinking habit per day that means how many glasses of water they take in a day. We have categorized it into 3-categories: 4-6 glasses, 7-8 glasses & more. 34.09% of participants have told that they take 4-6 glasses of water in a day. 43.18% and 22.73% of participants have said that they take 7-8 glasses of water and more respectively.

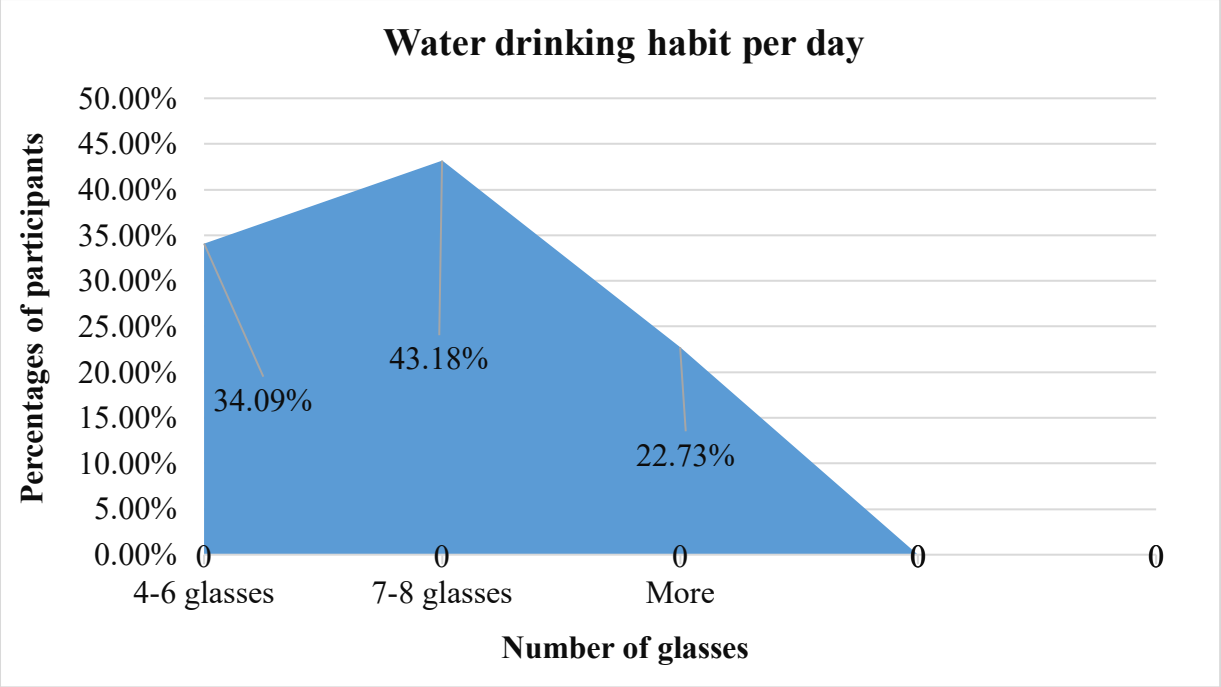


Figure 26: Participant's responses about their water drinking habit per day.

Table 16: Participant's responses in numbers & percentages about their water drinking habit.

Glasses per day	Number of participants	Percentages of participants
4-6 glasses	15	34.09%
7-8 glasses	19	43.18%
More	10	22.73%

3.2.4.2 Walking habit of participants

We asked the participants about their walking habit whether they walk daily routine basis and how long they walk daily. Many doctors suggest the doctors to walk daily for a particular time because physical movements help to ease the bowel movement. 34.09% of participants among 44 participants walk for daily basis. On the other hand, 36.36% participants walk once in a week and 29.55% participants walk twice or thrice in a week.

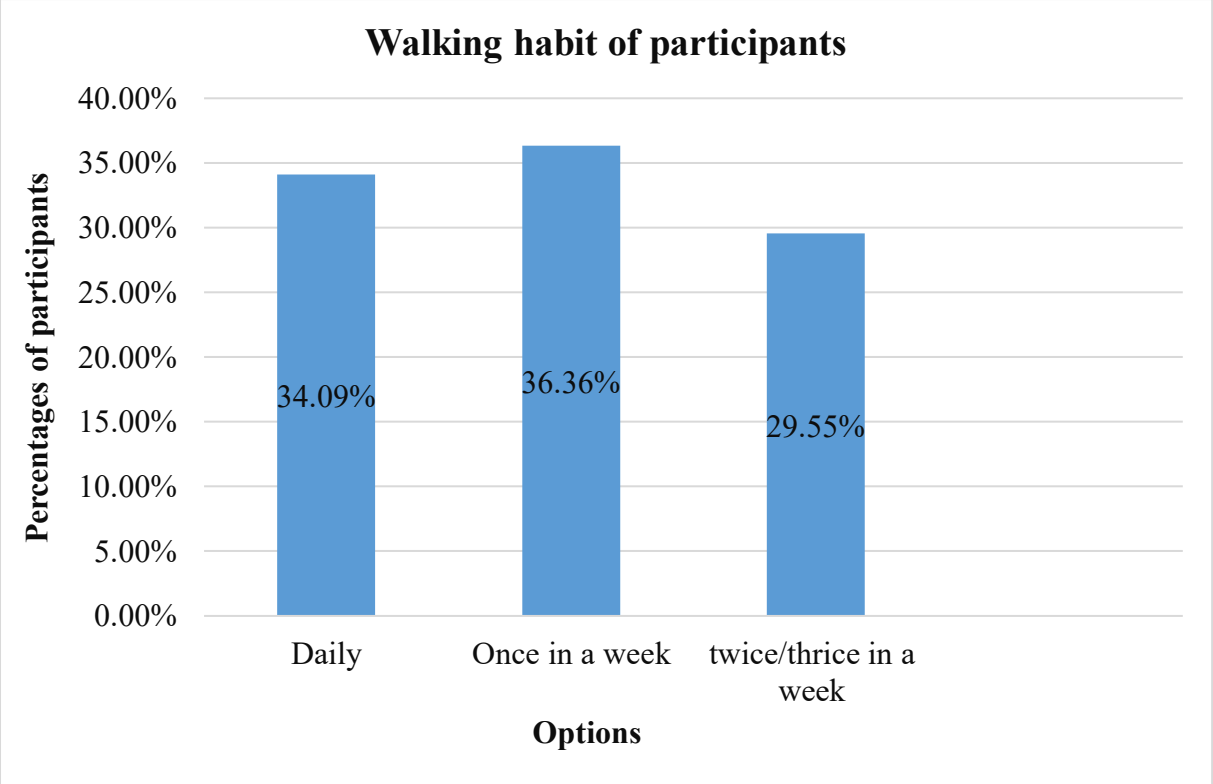


Figure 27: Participant's responses about their walking habits.

Table 17: Participant's responses in numbers & responses about their walking habits.

Walking habit	Number of participants	Percentages of participants
Daily	15	34.09%
Once in a week	16	36.36%
Twice/thrice in a week	13	29.55%

3.2.4.3 Vegetables eating habit in meal of the participants

We asked the 44 participants about their habit of eating vegetables. Almost more than half said that they take vegetables every day in their meal and rest of them doesn't take vegetables every day. 56.82% of participants eat vegetables in their meal every day and 43.18% of participants do not eat vegetables every day.

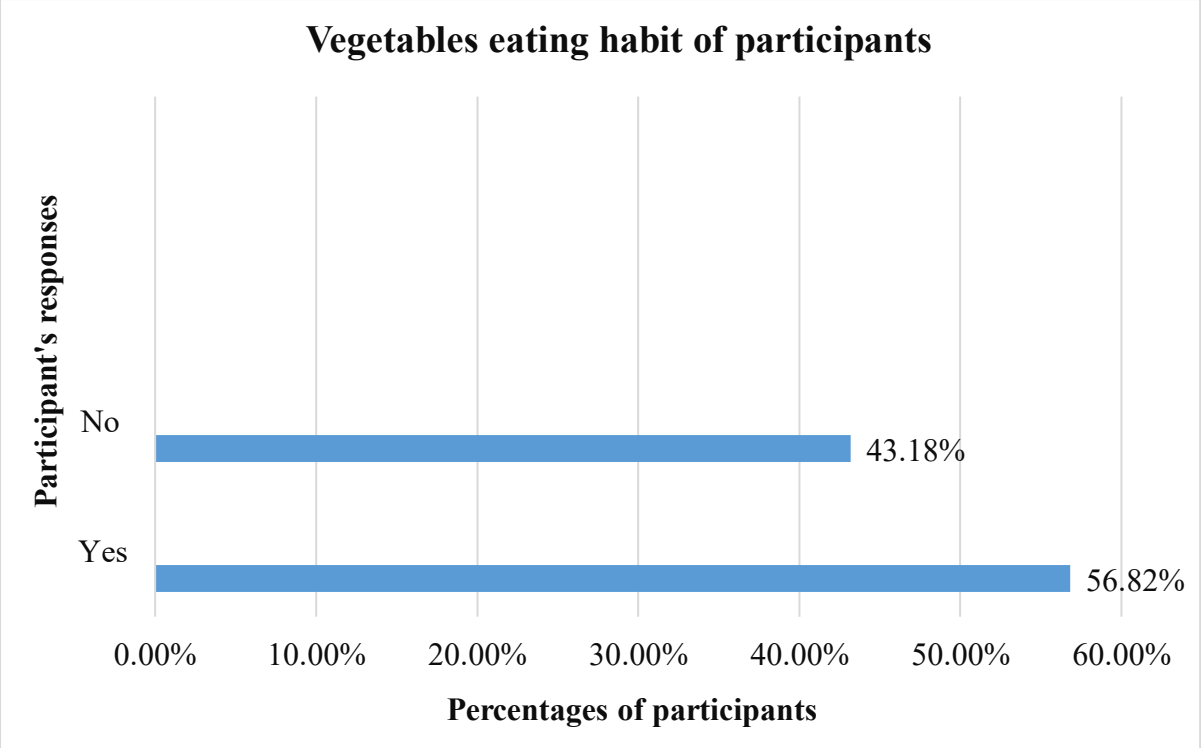


Figure 28: Participants responses about their vegetables eating habits.

Table 18: 16: Participants responses about their vegetables eating habits.

Vegetables eating habit	Number of participants	Percentages of participants
Yes	25	56.82%
No	19	43.18%

3.2.5 Constipation in different age group

To give a clear picture of the severity of constipation in pregnant women of Bangladesh, we had observed the severity among different age groups. We had categorized the age groups in four categories. We had found 9.09% of women who fall under the age group 16-20. 29.55% of participants had found in the age group 21-25. In addition to, 45.45% of participants were of the age group 26-30. Furthermore, 15.91% of women had age of 30 above.

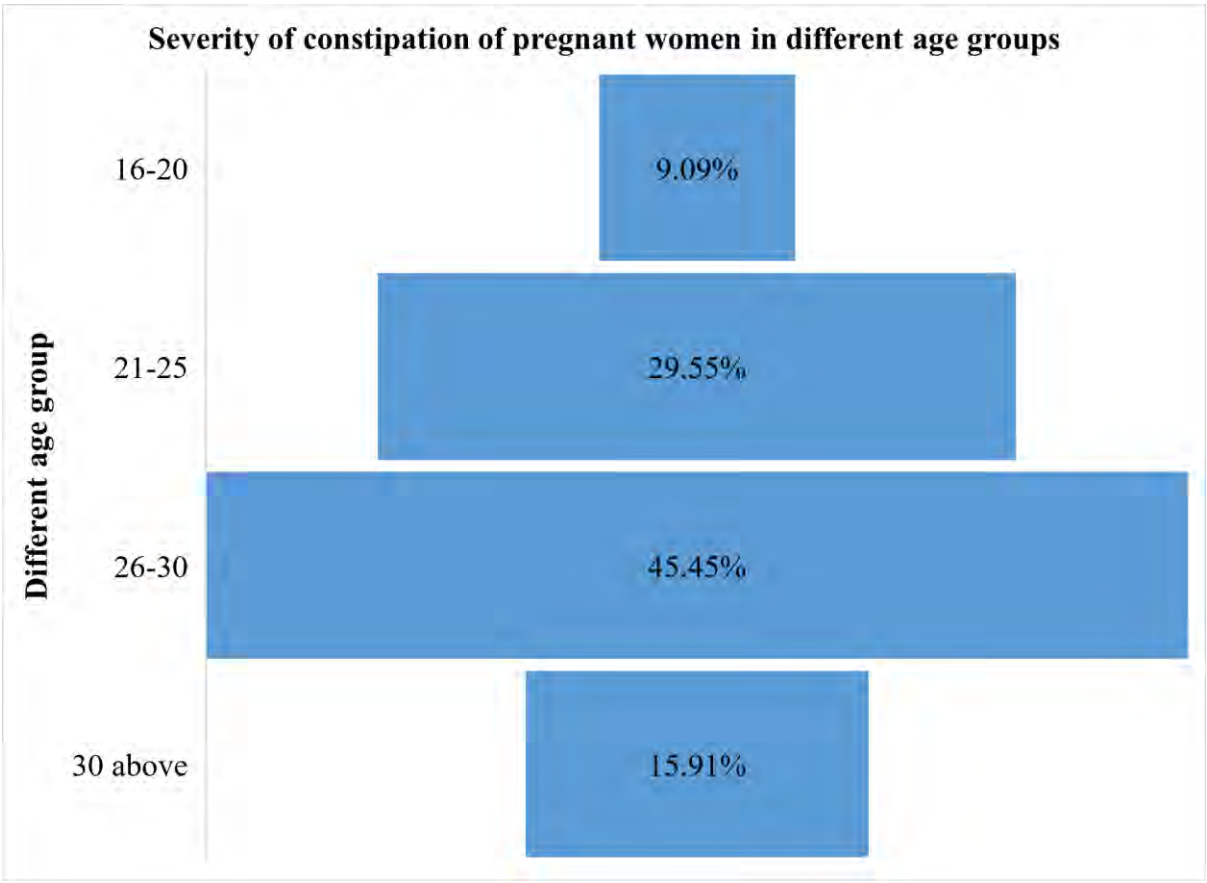


Figure 29: Participants responses in their different age groups.

Table 19: Participant's responses in numbers & percentages in their different age groups.

Age group	**Number of participants**	**Percentages of participants**
16-20	4	9.09%
21-25	13	29.55%
26-30	20	45.45%
30 above	7	15.91%

3.2.6 Differences between primiparous and multiparous

We had also noticed the severity of constipation in pregnancy between primiparous women and multiparous women. In our study, we have found 36.36% women who were primiparous women and suffered from constipation in their pregnancy or after delivery. Diversely, 63.64% of women who were multiparous women and suffered from constipation.

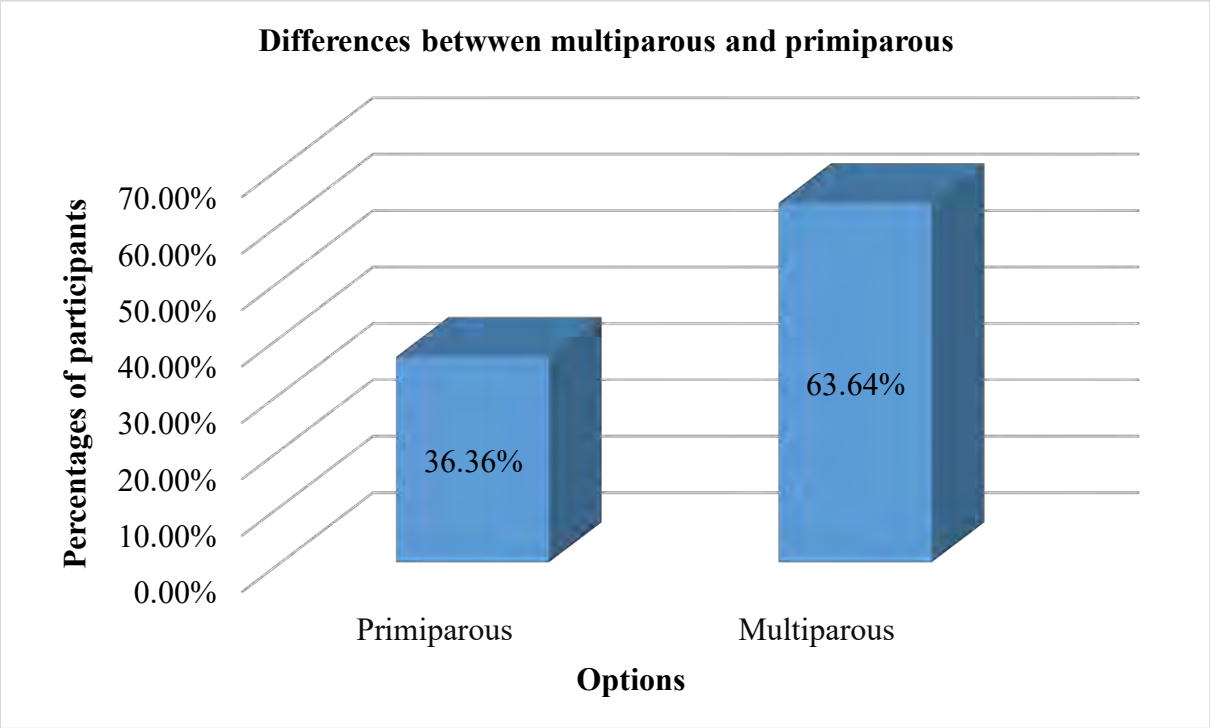


Figure 30: Participant's responses of being primiparous & multiparous.

Table 20: Participant's responses in numbers & percentages of being primiparous & multiparous.

Parous women	**Number of participants**	**Percentages of participants**
Primiparous	16	36.36%
Multiparous	28	63.64%

3.2.7 Comparison between housewives and working women

We have also studied the chances of having constipation during pregnancy between the working and house-wives pregnant women. From our study, we found that working women are more suffering from constipation. Even the percentage of house-wives women who are suffering from constipation is not less. Both the working and house-wives women are suffering from constipation but working women are suffering more from this problem during their pregnancy period. We found 40.91% of participants who are house-wives women and suffering from constipation. On the other hand, 59.09% of participants who are working women and are suffering from this problem.

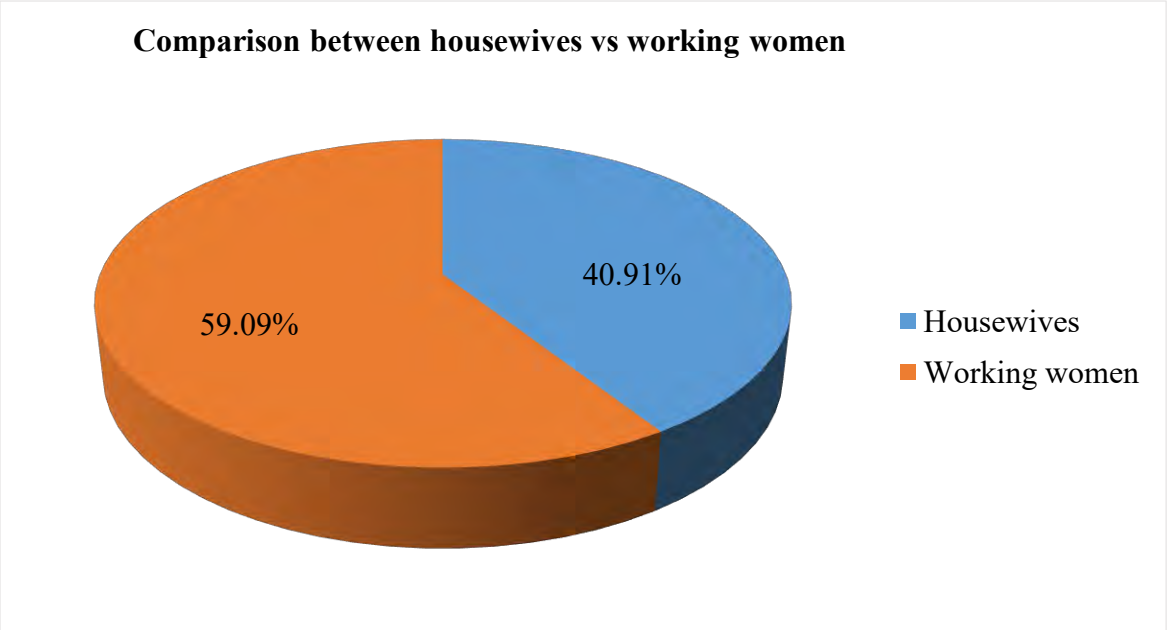


Figure 31: Participant's responses about their occupation.

Table 21: Participant's responses in numbers & percentages about their occupation.

	Number of participants	**Percentages of participants**
Working pregnant women	26	59.09%
House-wives pregnant women	18	40.91%

3.2.8 High risk pregnancy vs low risk pregnancy

Prolong bed rest causes constipation in case of high-risk pregnancy. To study the differences of constipation incidence between high risk pregnancy and low risk pregnancy, we asked the participants whether they are low risk pregnant or high risk pregnant categorized by your doctors. Among 44 participants 77.27% of participants are low risk participants and 22.73% participants are high risk participants.

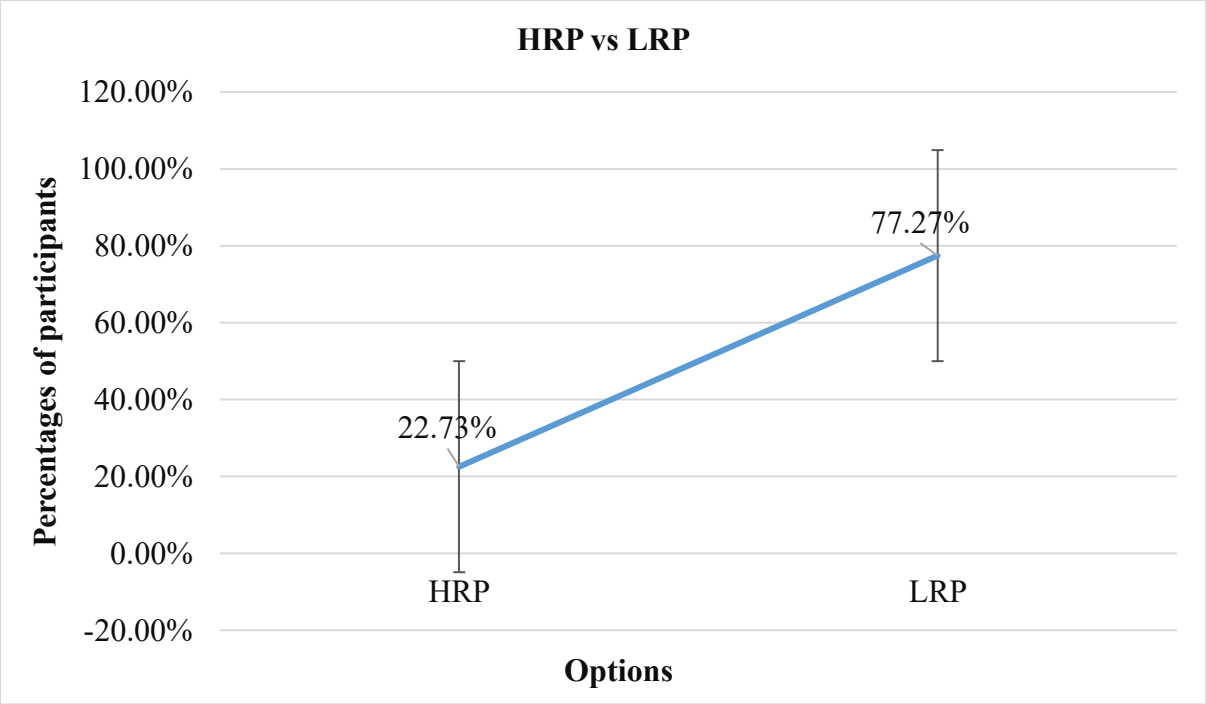


Figure 32: Participants responses about their category of risk.

Table 22: Participants responses in numbers & responses about their category of risk.

	Number of participants	**Percentages of participants**
High risk pregnancy	10	22.73%
Low risk pregnancy	34	77.27%

3.2.9 Treatment

We had asked the participants whether they had taken treatment for constipation during pregnancy or after delivery. 44 participants had answered this question. Among 44 participants, 42 participants which is 95.50% of women who said that they had taken treatment during their pregnancy for constipation and 4.5% of women had not taken any treatment.

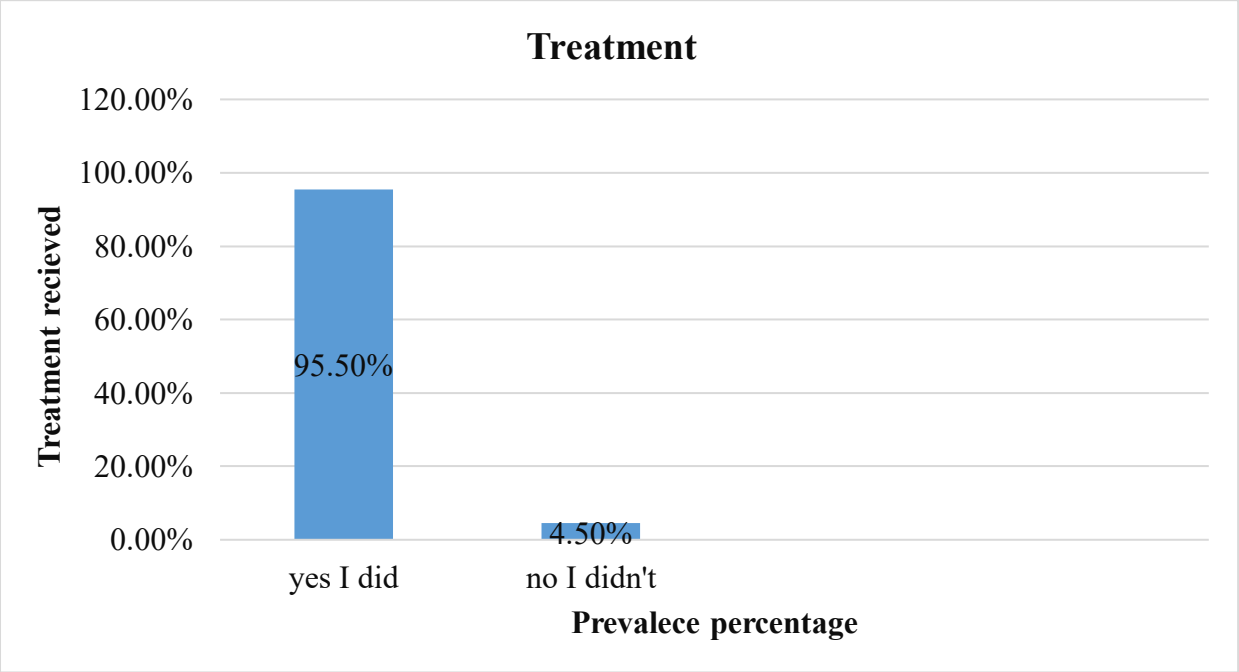


Figure 33: Participant's responses about taking treatment.

Table 23: Participant's responses in numbers & percentages about taking treatment.

Treatment received	Number of participants	Percentages of participants
Yes	42	95.45%
No	2	4.54%%

3.2.9.1 Type of treatment

Among 44 participants, around 42 participants had taken treatment for constipation during pregnancy. Doctors suggest two types of treatment: pharmacological & non-pharmacological. Pharmacological treatments include medicines and non-pharmacological treatment is treatment with lifestyle modification and others. Around 60.97% of participants among 41 participants had taken pharmacological treatment and 39.02% of participants had taken non-pharmacological treatment for treating constipation.

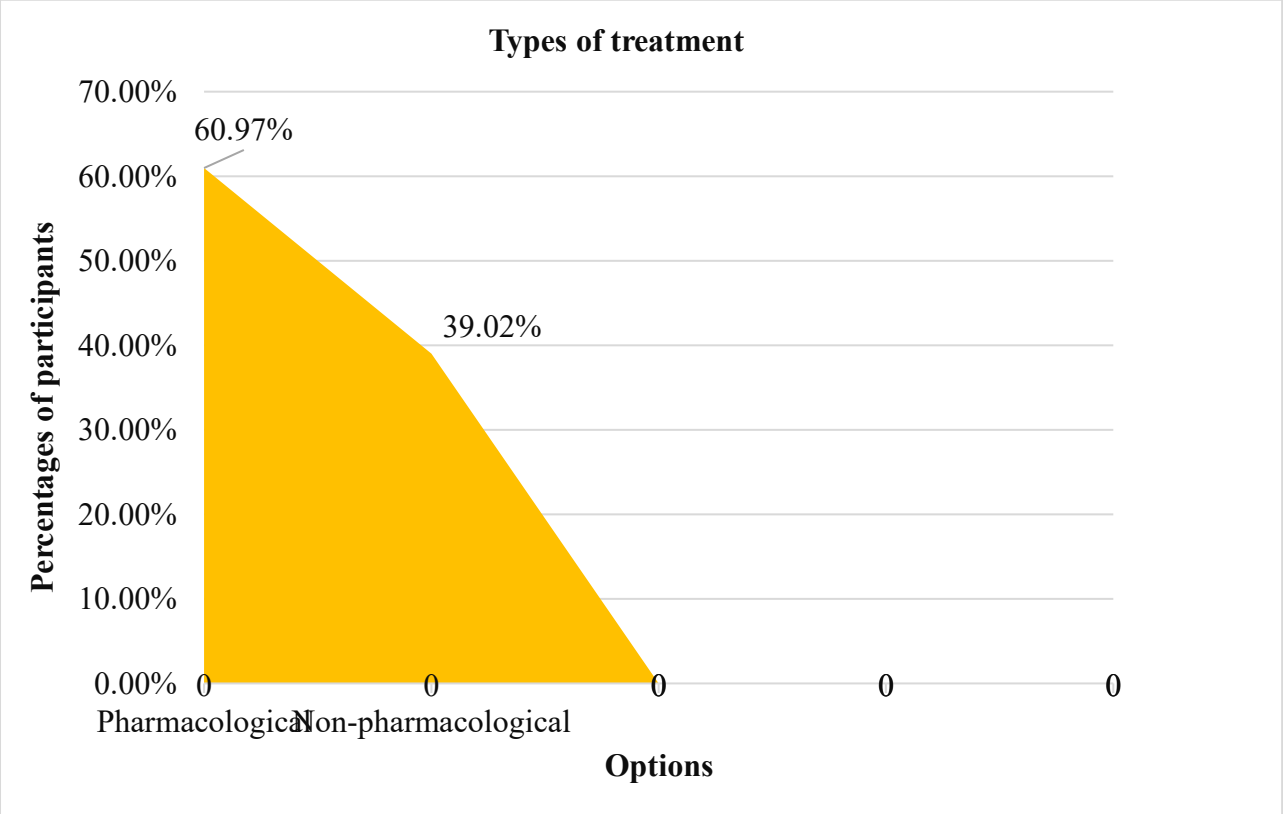


Figure 34: Participant's responses about taking types of treatment.

Table 24: Participant's responses in numbers & percentages about taking types of treatment.

Types of treatment	Number of participants	Percentages of participants
Pharmacological	27	61.36%
Non-pharmacological	17	38.64%

3.2.9.2 Types of laxatives

We had asked the participants about the laxatives they had taken. There are so many types laxatives used to treat constipation. By analyzing the names of the laxatives, we have found that bulk laxatives are used more often as it can be used for long term. However, the other laxatives such as stool softener, lubricant laxatives, osmotic laxatives, stimulant laxatives are not used for long term. They used for short term treatment. Most of the laxatives are safe because they are not absorbed systemically. In our study, we found that 59.09% of participants used bulk-forming laxatives, 4.55% of participants used stool softener, 20.46% of participants used osmotic laxative, 13.64% of participants used stimulant laxative and 2.27% of participants used lubricant laxative.

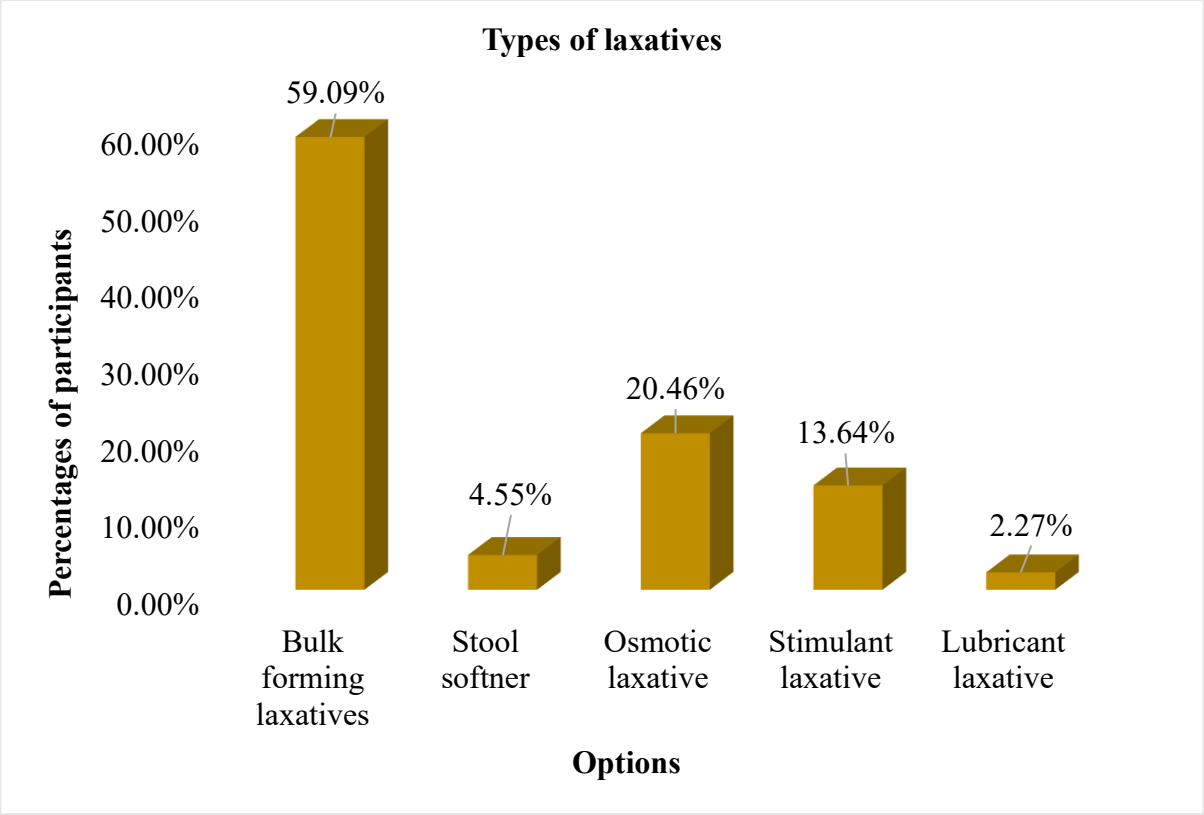


Figure 35: Participant's responses about taking types of laxative.

Table 25: Participants responses about in numbers & percentages about taking types of laxatives.

Types of laxatives	**Numbers of participants**	**Percentages of participants**
Bulk-forming laxative	26	59.09%
Stool softener	2	4.55%
Osmotic laxative	9	20.46%
Stimulant laxative	6	13.64%
Lubricant laxative	1	2.27%

Chapter 4

Discussions

The findings from this study suggest that the lifestyle, iron supplements and medications routine of a pregnant women have side effects like constipation in different trimesters of pregnancy among different age groups of pregnant women. This study also signifies this problem in case of primiparous and multiparous women who are working women and housewives. After analyzing the CAS results, it shows that most of the participants suffer from some to moderately severe constipation. Different patients have different types of symptoms. Constipation occurs in different stages of pregnancy. In this study, the result shows that pregnant women who are in their 1st trimester suffers most from constipation. The pregnant women who are in their 2nd and 3rd trimester suffer less comparatively. The iron supplementation is a major cause which creates constipation in the 1st trimester. This study shows that most of the pregnant women suffer from constipation after taking iron supplements. So, this is proved that constipation is a side effect of iron supplements. The lifestyle of the pregnant women is also studied to see the effects of it on constipation. In the life style study, we basically saw the water drinking and vegetables eating habit to see if they take enough fiber. When they were asked about the water drinking habit, we saw that most of the pregnant women do not drink water more than 6-7 glasses per day. Even the number of women who do not eat vegetables every day is not less. Added to that, we also studied their walking habit and a very few responded that they walked every day. This study also shows the result of constipation among different age groups of pregnant women. According to this study, the pregnant women whose age is between 26-30 suffer more from constipation rather than other age groups.

From this study, it was also found that multiparous women suffer more from constipation rather than primiparous women. One possible cause for this is pelvic floor dysfunction or

levator ani muscle injury. Many studies proved that pelvic floor dysfunction or levator ani muscle injury is most seen in multiparous women. For that reason, multiparous women are more prone to constipation. The incidence of constipation varies in case of working and housewives. According to this study, housewives are more seen with this problem because they do not move frequently or they are not active comparatively but the difference is very slight. The incidence of constipation between LRP and HRP was also observed. The result that got from this study is that HRP women have more tendency of causing constipation. Most of the high-risk pregnant women are suggested to take bed rest which might cause constipation. To correlate these, the patients was asked whether they are HRP women and found that most of them are LRP women in this study which is different from my expectation. The expectation of some more HRP women in this study could show the difference properly.

In case of treatment for constipation during pregnancy, the number of pregnant women who received the treatment was studied to see the awareness of them. It also found that maximum women had received the treatment unless some. The type of treatment has also studied to see how many pregnant women had treated with pharmacology and non-pharmacology individually and maximum women responded that they had been treated with pharmacology treatment. To see the effectiveness of the laxatives, types of laxatives are also studied by asking the participants about the laxatives they are suggested. This study shows that among all the laxatives bulk forming laxatives are most useful to treat constipation. This study aimed to determine whether lifestyle and medications have any effects on constipation and to see the difference of tendency of having constipation in different trimester among different age group and between primiparous and multiparous working and housewives.

Chapter 5

Conclusion

The primary aim of this study was to put spotlight on the updated facts of constipation in Bangladeshi pregnant women. The study revealed that approximately 56% of women have some to moderately severe constipation. Besides, the study also showed that housewives were more prone to constipation than working women. A large portion of 1st trimester pregnant women who are housewives and whose age group were in between 26-30 and who were multiparous women were suffering from constipation. Most of the time, those women who had minimum problem or some problem of constipation did not take their symptoms of constipation seriously and did not take any treatment for this disorder but almost 95.50% of women had taken treatment in this study. In reference to our findings, it was recommended to introduce this maternal problem properly and to create awareness among people including maternal health professionals. Moreover, a proper screening program for maternal health issues should be inaugurated to find out the condition of this maternal problems and reducing the risks during pregnancy. Additionally, different social support groups and more nursing homes should be set up to demonstrate a new picture of women sharing problems regarding their maternal mental health with others and taking proper advice to diminish it. Furthermore, maternal healthcare professionals had to be more helpful and encouraging in this wonderful period in a woman's life. As this research was for undergrad program, the time period was very short to work with a large number of data. For that reason, the result was not of a broad range. If this study was done with a large data, more accurate result could be achieved.

Chapter 6

Future research directions

This study will help to create awareness for improving maternal health. The result and data can be used to aware the people who are related with healthcare so that they emphasize more on this issue. Many seminars can be organized where the result of this study can be showed to understand them the severity of constipation in our country's pregnant women. Moreover, this study can be expanded by correlating this problem with other maternal disease like postpartum depression, gestational diabetes. If anyone wants to do research about constipation in postpartum cases, the data of this research can be helpful to compare.

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