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7-2018

### Pathophysiology of Irritable Bowel Syndrome

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# Pathophysiology of Irritable Bowel Syndrome

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## Introduction

- Irritable Bowel Syndrome (IBS) is one of the most common functional gastrointestinal disorders. IBS causes abdominal pain and is associated with altered bowel habits (Dlugosz, Zakikhany, Acevedo, D'Amato, & Lindberg, 2017, p. 1).
- IBS affects between 25 and 45 million people in the United States. About 2 in 3 IBS sufferers are female (International Foundation for Functional Gastrointestinal Disorders, Inc [IFFGD], 2018).
- IBS is estimated to affect as many as 5-20% of individuals worldwide (SJFM, 2015, para. 1).
- It is estimated the annual health care cost spent on IBS in the United States is \$8 billion. IBS accounts for up to 50% of referrals to gastroenterologists, making it the most common cause for referrals (Snyder, 2018).
- IBS causes a variety of gastrointestinal symptoms ranging from mild to severe and is divided into different subtypes based on symptomatology: Diarrhea-predominant IBS (IBS-D), constipation-predominant IBS (IBS-C), and mixed diarrhea and constipation-predominant IBS (IBS-M). While IBS is not known to cause increased mortality, for patients suffering with IBS, it can result in a significantly reduced quality of life (San Jose Functional Medicine [SJFM], 2015, para. 1).
- IBS can cause intense discomfort and can also affect a patient's quality of life. Therefore, it is important that primary care providers, such as Family Nurse Practitioners (FNPs), recognize the symptoms associated with IBS, correctly rule out differential diagnoses through thorough assessment, and appropriately refer patients to gastroenterology if warranted. Since IBS is one of the most common GI disorders, it is likely FNPs will encounter patients suffering from the disorder during their career, and they should feel comfortable caring for patients with IBS and be able to provide patients with a well-rounded approach to IBS symptom management.

## Underlying Pathophysiology

There are no structural abnormalities within the gastrointestinal system to explain the discomforts associated with IBS. Recent research shows the pathophysiology of IBS is multifactorial and evidence suggests several factors such as "motility, inflammatory, genetic, immune, psychological, and dietary components" can contribute to the development of IBS (Snyder, 2018, "Definition").

**Inflammatory:** Intestinal biopsies and measurements of cytokines have shown that chronic low-level inflammation occurs in a significant number of IBS cases (Rountree, 2013, p. 289). In some IBS patients, GI symptoms appear following an infection. "Post-infectious IBS has been reported after viral, bacterial, protozoa and nematode infections" (SJFM, 2015, "Inflammation"). Following infection, the initial inflammatory response results in an increase in lymphocytes and macrophages. The inflammatory response typically decreases, however, in IBS sufferers there are persistent GI symptoms consistent with low-grade systemic inflammation (SJFM, 2015, "Inflammation").

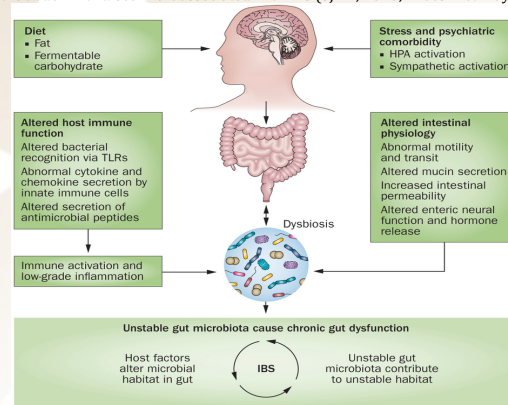
**Dysbiosis,** which is a disruption in the normal balance of the gut microbiome, is now being recognized as a major contributing factor in the development of IBS. (Rountree, 2013, p. 289).

**Genetic:** In one study, up to 33% of patients with IBS had a family history of IBS compared to only 2% of the controls reporting a family history. Another study found a significant association between having a first degree family member with reported GI symptoms and the development of IBS, suggesting a genetic involvement (SJFM, 2015, "Heritability and Genetics").

**Immune:** Dlugosz et al. found significantly upregulated expression of toll-like receptors (TLR) 4, 5, and 9 in small bowel mucosa of patients with IBS. These increases in the number of toll-like receptors suggests an impairment of the immune system response to normal flora in the small bowel mucosa of IBS patients (Dlugosz et al., 2017, p. 4).

**Psychological:** Coexisting psychological issues are believed to mediate changes in gut permeability, contributing to the development of IBS symptoms. This brain-gut theory of IBS proposes that "an abnormal stress response, in combination with psychological distress (e.g., anxiety, depression, or somatization), and an infectious or inflammatory response may alter intestinal permeability and initiate a cascade of events (e.g., infiltration of inflammatory cells, localized edema, and release of cytokines or chemokines) that result in the development of IBS symptoms" (Ford, Lacy, & Talley, 2017, p. 2568).

**Dietary:** Many IBS patients appear to be sensitive to foods containing short-chain carbohydrates called FODMAPs, which are not fully digested or absorbed. These poorly digested carbohydrates enter the small intestine and colon where they provide a substrate for bacterial fermentation, which produces gas within the intestinal tract. This distention can cause the abdominal discomfort associated with IBS (SJFM, 2015, "Does Diet Play a Role?").



## Significance of Pathophysiology

- IBS is associated with "high psychological and medical comorbidity, increased healthcare utilization, decreased work productivity, and diminished quality of life" (Weaver, Melkus, & Henderson, 2018, p. 312).
- In one study, over half of the 1,966 patients surveyed reported missing employment, academic, and social activities because of their IBS symptoms. In another retrospective meta-analysis that compared results of 18 studies, employees with IBS missed on average between 8.5 to 21.6 days of work annually (Weinstock, 2018, p. 3).
- While stress alone does not cause IBS, due to the connection between the brain and the gut, stress can worsen or trigger symptoms (IFFGD), 2018, "Facts About IBS"). Symptoms often come and go, making it difficult to predict and plan around, which causes additional stress in patients with IBS.
- IBS symptoms can exacerbate symptoms of mood disorders such as anxiety and depression, which then increases the severity of the gastrointestinal symptoms associated with IBS. Developing research shows that in up to 50% of those suffering from IBS, the gastrointestinal discomforts develop first, with subsequent development of mood disorders (Ford et al., 2017, p. 2568).

## Irritable Bowel Syndrome

Image retrieved from: <https://montereybayholistic.com/2014/06/01/irritable-bowel-syndrome/>

## Signs and Symptoms

- Abdominal pain and discomfort
  - Changes in bowel habits, frequency, and consistency of stool (diarrhea, constipation, or both).
  - Abdominal cramps
  - Discomfort or pain typically relieved after a bowel movement
  - Symptoms occur over a long period of time and typically come and go
- About 25% to 50% of people who suffer from IBS commonly report additional GI symptoms including:
- Heartburn
  - Early feeling of fullness (satiety)
  - Nausea
  - Abdominal fullness
  - Bloating
- Diagnosis of IBS by predominant stool pattern using the Rome IV staging:
- IBS with constipation (IBS-C): hard or lumpy stools for  $\geq 25\%$  of bowel movements and loose (mushy) or watery stools for  $\leq 25\%$  of bowel movements.
  - IBS with diarrhea (IBS-D): loose (mushy) or watery stools for  $\geq 25\%$  of bowel movements and hard or lumpy stool for  $\leq 25\%$  of bowel movements.
  - Mixed IBS (IBS-M): hard or lumpy stools for  $\leq 25\%$  of bowel movements and loose (mushy) or watery stools for  $\leq 25\%$  of bowel movements.
  - Unspecified IBS: insufficient abnormality of stool consistency to meet criteria for IBS-C, IBS-D, or IBS-M. (Snyder, 2018, "Definition").
- (IFFGD), 2018, "Signs and Symptoms").

## Implications for Nursing Care

- Nurses and providers play a crucial role in the management of IBS patients and "a personalized approach to patients with IBS may identify etiological and perpetuating mechanisms behind symptom exacerbation and help to direct medicinal, nutritional, psychological, and/or physical interventions with which to optimize patient care" (Weaver et al., 2018, p. 319).
- There is often a stigma regarding disorders involving the bowels, and it is crucial that providers develop a trusting relationship with clients where they feel comfortable openly discussing their symptoms and concerns.
- Since the pathophysiology of IBS is so multifactorial, care should be individualized and a holistic approach should be taken. It is crucial providers focus not only on the physical symptoms of IBS, but also the psychological aspect of the disease and the affect it can have on the patient's overall quality of life.
- Dietary modifications should be initiated first, specifically, a low FODMAP diet. Exercise and stress-reduction measures should also be encouraged (Ford et al., 2017, p. 2576). Referrals to a gastroenterologist and a nutritionist should be considered if symptoms are severe or persist despite dietary changes.
- Patients should be regularly screened for depression and anxiety, and since there is no curative treatment for IBS, counseling or alternative therapies should be considered if the patient shows interest.
- Patients should be encouraged to visit online educational sites and be provided with up-to-date patient education. Additionally, patients might benefit from joining a support group where they feel comfortable openly discussing their IBS symptoms and how it affects their quality of life.

## Conclusion

IBS can severely impact a patient's quality of life, and it is crucial that health care providers feel comfortable caring for patients with IBS. The pathophysiology of IBS is multifactorial and prompt recognition of the symptoms of IBS can result in maintaining the highest level of quality of life for patients. Practitioners should feel comfortable involving other specialties and utilizing a multidisciplinary approach when providing care to best combat the several compounding factors that can lead to the development of IBS. IBS can lead to mood disorders such as anxiety and depression which can contribute to other serious comorbidities.

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