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IBS AMONG WOMEN: PREVALENCE, HEALTH IMPACT AND SUSTAINABLE NUTRITION MANAGEMENT THROUGH LOW FODMAP DIET

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ABSTRACT

Background: Irritable Bowel Syndrome (IBS) is a chronic gastrointestinal disorder characterized by recurrent abdominal pain and altered bowel habits such as constipation, diarrhea, or both. Globally, IBS affects **14% of women** and **8.4% of men**, with women experiencing a **67% higher prevalence**. In India, IBS is more common in women (**32.1% vs. 26.6% in men**), influenced by hormonal fluctuations, visceral hypersensitivity, high fiber and spicy food intake, psychosocial stress. In the Indian context, a randomized trial from northern India showed that a Low FODMAP (fermentable oligo-, di-, monosaccharides and polyols) diet mitigated gastrointestinal symptoms.

Aims: The present review aims to explore the gender-based prevalence of IBS, focusing on its impact on women's health in India as well as globally, and to evaluate the efficacy of the Low FODMAP diet as a sustainable nutrition management strategy.

Methods: Using a mixed-method approach, the study analyzes existing literature, epidemiological data, and clinical findings to highlight dietary influences, stress-related triggers, and socio-cultural challenges faced by women.

Results: Systemic review indicates the need for dietary modifications, including a Low FODMAP approach, to ensure long-term symptom relief while maintaining nutritional adequacy.

Conclusion: Adapting Indian cuisine to fit a low FODMAP diet can be challenging, as many traditional Indian dishes contain ingredients high in FODMAPs such as lentils, certain vegetables, and wheat-based products. However, adapting traditional recipes and increasing awareness can facilitate adherence. Emphasizing women's health and nutrition through such dietary modifications aligns with sustainable health practices, potentially reducing healthcare burdens and enhancing quality of life.

Keywords: IBS, Gender-Based Prevalence, Women's Health, Low FODMAP Diet, Sustainable Nutrition Management

1. INTRODUCTION

Irritable Bowel Syndrome (IBS) is a chronic gastrointestinal disorder marked by recurrent abdominal pain, bloating, and altered bowel habits like diarrhea, constipation, or both **[1]**. As a leading Functional Gastrointestinal Disorder (FGID), it affects 10–15% of the global population, contributing to significant morbidity, decreased quality of life, and increased healthcare use **[2, 3]**. Epidemiological studies consistently show that IBS disproportionately affects women, with prevalence rates 1.5 to 3 times higher than in men **[4, 5]**. Among IBS subtypes, IBS with constipation (IBS-C) is notably more common in women **[6]**. Women with IBS often experience extra-intestinal symptoms including fibromyalgia, headaches, back pain, and genitourinary symptoms. Studies reveal a higher prevalence of gynecological disorders; about 30% report chronic pelvic pain worsening during menstruation and 32% report sexual function concerns like dyspareunia. IBS also severely affects mental health, work productivity and social life **[7]**. Psychological factors, including panic, generalized anxiety, mood and post-traumatic stress disorders along with sleep disturbances are linked to symptom severity **[8]** Compared to men, women with IBS experience greater fatigue, anxiety, depression, and lower quality of life **[6]**. Gender disparities in IBS prevalence may vary by region, influenced by hormonal fluctuations, visceral hypersensitivity, psychological stress, diet,

cultural practices and healthcare access **[4, 9]**. In countries such as India, Bangladesh and Malaysia, where much of the population lives in rural areas, epidemiological data on IBS are limited, highlighting the need for region-specific research and guidelines adapted to local diets and healthcare systems **[10]**. The brain-gut axis significantly contributes to IBS pathogenesis, where stress and dietary triggers affect gut motility and hypersensitivity **[11]**. Women often experience heightened stress, anxiety and depression, worsening symptoms **[12]**. High-FODMAP foods intensify symptoms, making dietary modifications critical **[13]**. This review analyzes the prevalence, health impact and pathophysiology of IBS among women, focusing on the influence of stress, diet, and hormones. It aims to summarize recent findings and evaluate sustainable nutrition strategies, particularly the Low FODMAP diet, to improve women's long-term quality of life while maintaining nutritional balance.

2. AIMS & OBJECTIVES

The aim of this review is to collect results obtained from various studies in order to spot more light towards the following surprising area like

- ➢ To analyze the prevalence of IBS among Indian women compared to men and women across different geographical regions and socio-economic backgrounds.
- ➢ To identify biological, psychological and socio-cultural factors contributing to IBS in women.
- ➢ To find out the role of the FODMAP diet in the pathogenesis of IBS in women.
- ➢ To examine the effectiveness of dietary interventions, particularly the Low FODMAP diet, in managing IBS among Indian women.
- ➢ To highlight the need for sustainable dietary management for IBS in women.

3. MATERIALS & METHODS

A mixed-method approach was adopted, utilizing epidemiological data from hospitals and higher education institutions, dietary surveys and peer-reviewed literature reviews. Background information was collected from studies (2000–2025) via Google Scholar, Scopus, Web of Science and PubMed. Studies from the past 25 years, including systematic reviews, meta-analyses, observational and clinical studies on IBS prevalence, pathophysiology, psychological impacts, dietary management and healthcare interventions were included. Descriptive and comparative analyses assessed gender-based prevalence and dietary outcomes. From 100

collected papers, 75 full texts were reviewed and 36 studies were finalized for analysis.

4.1 Prevalence of IBS among Women: Gender, Regional, and Socio-Economic Comparisons

Globally, IBS affects about 15% of the population, with women showing a higher prevalence than men. In Western countries, it is reported 1.5 to 3 times more common in women. Globally, IBS prevalence varies across regions. The highest rates are observed in South America (18.9%) and the Eastern Mediterranean (17.5%), while Southeast Asia reports the lowest prevalence at 11.0% **[14, 7]**. However, Indian studies reveal a different pattern. Community-based research shows a similar prevalence between genders. A study in Haryana reported 4% prevalence with a male-to-female ratio of 77:114, while Uttar Pradesh showed 2.7% with a ratio of 45:30. IBS prevalence across India ranges from 0.4% to 4.2%, influenced by diet, lifestyle, genetics and diagnostic criteria **[15, 16]**. Findings from the Indian Society of Gastroenterology Task Force indicate that middle-aged men constitute the majority of IBS patients, though hospital-based data likely reflect male-dominant healthcare-seeking behavior **[10, 17]**. Socio-economic status also influences IBS prevalence. Some studies associate higher rates with lower socio-economic status due to stress and poor healthcare access **[7]**, while others link it to higher socio-economic groups, possibly due to better health awareness and access. In conclusion, IBS predominantly affects women in Western populations, whereas Indian data suggest a more balanced gender prevalence. **Table1** statistically summarizes the prevalence patterns across genders, regions and socio-economic backgrounds.

Table 1: Prevalence of IBS among Indian Population by Gender, Region, and Socio-Economic Status [17, 15]

Category	Prevalence Rate (%)	Remarks
Gender Comparison		
Indian Women	**2.7% - 4.0%**	**Comparable to men; variations by study**
Indian Men	**2.7% - 4.2%**	**Similar to women, differing from Western trends**
Global Women	**15% (avg.)**	**1.5 - 3 times higher than men in Western countries**
Geographical Variations		
North India (Haryana)	**4.0%**	**Male-to-female ratio: 77:114**
North India (Uttar Pradesh)	**2.7%**	**Male-to-female ratio: 45:30**
Southeast Asia (Global)	**11.0%**	**Lowest global prevalence**
South America (Global)	**18.9%**	**Highest global prevalence**
Eastern Mediterranean	**17.5%**	**Higher rates than India**
Socio-Economic Impact		
Lower Socio-Economic Status	**Higher prevalence**	**Attributed to stress, lack of healthcare access**
Higher Socio-Economic Status	**Higher awareness**	**More diagnosis due to access to medical care**
India (Overall Range)	**0.4% - 4.2%**	**Varies by diagnostic criteria & region**

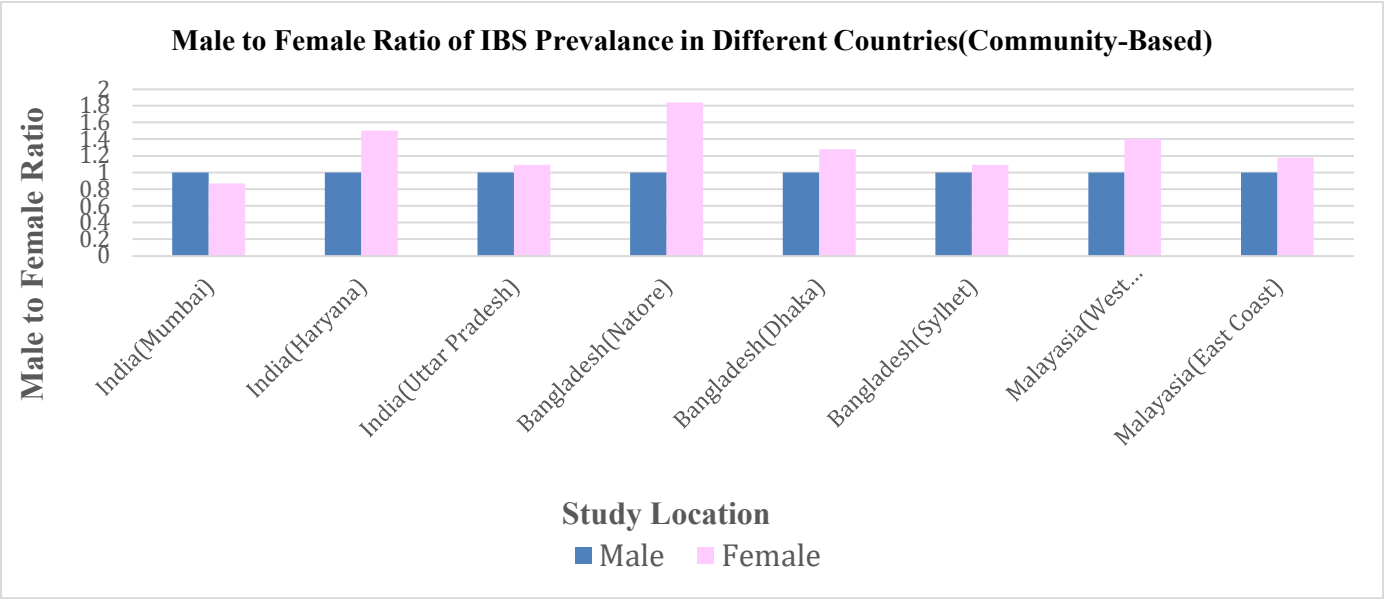


Figure 1: Bar diagram showing the male-to-female ratio of IBS prevalence in community-based studies from India, Bangladesh, and Malaysia

Based on Rahman *et al*. (2017), IBS prevalence among women in Asian countries like India, Bangladesh and Malaysia varies across studies. A summary of the data is presented below in **Table 2**.

Table 2: Prevalence of IBS among Asian population like India, Bangladesh, and Malaysia: Gender and Region specific

Country	Study Location	Sample Size	IBS Prevalence (%)	Male/Female Ratio (*A ratio greater than 1 suggests a higher prevalence among females.*)
India	Mumbai	2,549	7.5	1:0.87
	Multiple sites	4,500	4.2	1:0.93
	Haryana	4,767	4.0	1:1.5
	Uttar Pradesh	2,876	6.8	1:1.09
Bangladesh	Natore (Rural)	2,426	8.5	1:1.84
	Dhaka (Urban)	1,503	7.7	1:1.28
	Sylhet	3,000	12.9	1:1.09
Malaysia	West Coast (Urban)	1,179	14.0	1:1.4
	East Coast (Rural)	Not specified	10.9	1:1.18

These variations highlight the influence of geographical, cultural and methodological factors on the epidemiology of IBS among women in these regions. A community-based study from Northern India also indicate that this gender disparity in IBS prevalence is even exist in subtype **(Table 3) [17]**.

Table 3: Gender Distribution and Prevalence of Subtypes of Irritable Bowel Syndrome (Northen India)

IBS type	Total	Men (n = 2,383)	Women (n = 2,384)
IBS (total)	191	77 (3.2%)	114 (4.8%)
IBS-C(constipation predominant)	12	4 (0.2%)	8 (0.3%)
IBS-D (diarrhea predominant)	72	30(1.3%)	42(1.8%)
IBS-M(mixed type)	81	34(1.4%)	47(2.0%)
IBS-U(unsubtyped)	26	9(0.4%)	17(0.7%)

In India, gender disparities amplify the IBS burden on women, with limited healthcare access, sociocultural stigma and a lack of gender-specific care contributing to delayed diagnosis and treatment **[9]**.

4.2 Influence of Biological, Psychological, Socio-Cultural Factors & Dietary pattern on Pathophysiology of IBS in Women

IBS is classified as a syndrome, meaning a group of symptoms, rather than a single disease. This is because distinct underlying mechanisms may drive disease progression in different groups of patients. Several possible mechanisms have been identified in its pathogenesis, which include:

4.2.1. Biological Factors

4.2.1.1 Hormonal Imbalances

Women with IBS often experience more severe symptoms, including intense abdominal pain, bloating and a higher prevalence of constipation-predominant IBS (IBS-C), compared to men, due to hormonal influences on gut motility and pain perception **[18]**. The menstrual cycle, consisting of the follicular, ovulation and luteal phases, affects estrogen and progesterone levels, which modulate visceral sensitivity and gastrointestinal motility. This hormonal fluctuation contributes to symptom variability, including abdominal pain, bloating and altered bowel habits **[19]**. About one-third of asymptomatic women experience GI symptoms during menstruation and 40% of IBS patients report cycle-related symptom changes. A 10-year Icelandic study found IBS patients with dysmenorrhea were twice as likely to experience worsened symptoms. Additionally, IBS is strongly associated with endometriosis and polycystic ovary syndrome (PCOS), a common endocrine disorder in reproductive-age women **(Table 4) [20]**.

Table 4: Correlation between Hormonal Status and IBS Symptom Expression [20]

Hormonal Status	Effect on IBS Symptoms	Mechanism of Action
Follicular Phase (Mid-Cycle Estrogen Increase)	Possible reduction in symptoms	Estrogen enhances serotonin signaling, improving GI motility and reducing pain perception.
Ovulation (Estrogen Drop)	Possible increase in symptoms	Sudden estrogen decline may increase visceral hypersensitivity.
Luteal Phase (Estrogen & Progesterone Increase)	Mixed effects—some report symptom relief, others worsening	Progesterone slows GI motility, potentially causing bloating and constipation.

Menstruation (Low Estrogen & Progesterone)	**Symptom exacerbation worsening pain, bloating, altered bowel habits**	**Low hormone levels lead to increased visceral sensitivity and altered colonic function.**
Pregnancy (High Estrogen & Progesterone)	**Potential symptom relief for some women**	**Increased progesterone reduces motility, while estrogen modulates pain perception.**
Menopause (Low Estrogen & Progesterone)	**Reduced IBS prevalence but increased severity in some cases**	**Loss of hormonal regulation may lead to changes in gut motility and pain perception.**
Hormone Replacement Therapy (HRT)	**Increased IBS prevalence in some women**	**Exogenous estrogen may impact gut motility and visceral sensitivity.**
Polycystic Ovary Syndrome (PCOS) (High Androgens, Low Progesterone)	**Higher prevalence of IBS symptoms**	**Hormonal imbalance and metabolic factors (obesity, insulin resistance) contribute to altered gut function.**
Dysmenorrhea (Painful Periods)	**Increased IBS symptom severity**	**Heightened pain perception and inflammatory response.**
Endometriosis (Chronic Inflammation, High Estrogen Response)	**Strong correlation with IBS symptoms**	**Increased pelvic nerve sensitivity and immune activation contribute to gut dysfunction.**
Transsexual women (male-to- female subjects)	**Estrogen/anti-androgen treatment**	**Development of chronic pain including visceral pain**

4.2.1.2 Gut-Brain Axis Dysfuntion-

Irritable Bowel Syndrome (IBS) is a chronic condition caused by the complex interaction between the gut and the brain, making it one of the most prevalent Disorders of Gut-Brain Interaction (DGBIs) without structural damage. It is linked to disruptions in communication between the gut and the central nervous system, known as the gut-brain axis. This axis involves complex interactions between the gastrointestinal tract, nervous systems and immune signaling. Sensory nerve endings in the gut transmit signals about the intestinal environment to the brain, which integrates this information to regulate gut activities. Dysregulation of this axis plays a key role in IBS, with heightened sensitivity in sensory nerve endings (visceral hypersensitivity) contributing to increased pain perception **[21]**. Neurotransmitters like serotonin and dopamine, which influence mood and gut function, are often dysregulated in IBS patients. In women, hormonal fluctuations and psychosocial stressors may alter gut-brain communication patterns **[20]**. Estrogen, in particular, modulates serotonin synthesis and receptor sensitivity. Serotonin (5-HT), a key neurotransmitter produced primarily (95%) in the gut by enterochromaffin cells regulates gut motility, pain perception and mood **[22]**. In IBS, dysregulated serotonin signaling affects tryptophan hydroxylase, the enzyme responsible for serotonin production and serotonin receptors (5-HT3, 5-HT4). Disruptions in serotonin reuptake impair serotonergic signaling in the enteric nervous system, leading to motor, sensory and secretory dysfunctions, which contribute to IBS symptoms **[23]**.

4.2.1.3 Mechanisms of Microbiota Alteration in IBS pathogenesis

The gut microbiota, a diverse community of microorganisms in the gastrointestinal tract, plays a crucial role in gut health and the gut-brain axis. Dysbiosis, an imbalance in this microbial ecosystem is commonly seen in IBS patients, with reduced microbial diversity and altered bacterial populations, including a decrease in *Lactobacillus* and *Bifidobacterium* and an increase in pathogenic strains like *Escherichia coli*. Sex hormones may influence the composition and function of gut microbiota referred to as the "microgenderome," impacting intestinal barrier function, immune activation and GI health, potentially contributing to IBS development.

Pathogenesis of IBS due to dysbiosis includes:

- Disruption in neurotransmitter production (serotonin, GABA), affecting mood, gut motility and CNS communication, potentially causing mood disorders like anxiety and depression.
- Altered gut bacteria affect short-chain fatty acid (SCFA) production, influencing motility and sensitivity, worsening IBS symptoms.
- Dysbiosis leads to low-grade inflammation, increased mast cell activity and cytokine release (IL-6, TNF-α), enhancing pain perception.
- Weakening of tight junctions in the intestinal epithelium allows bacterial toxins and food antigens to enter the bloodstream.
- Changes in microbiota affect bile acid transformation, contributing to stool inconsistency in IBS-D and IBS-C **[24]**.

4.2.2. Psychological Influence

Psychological factors significantly influence IBS, with women reporting higher levels of anxiety and depression than men **[21]**. The brain-gut axis plays a crucial role in IBS pathogenesis, where psychological distress alters gut motility, immune function and microbiome composition, intensifying symptoms in women (Van Oudenhove *et al*., 2010). Studies show a bidirectional relationship between IBS and mood disorders—major depressive disorder (MDD) increases the risk of IBS and IBS predisposes individuals to MDD, suggesting shared pathophysiological mechanisms **[25]**. Early-life stressors including adverse childhood experiences, disrupt the brain-gut axis, increasing the likelihood of developing IBS and other stress-related disorders. Societal pressures, caregiving responsibilities, gender-related stressors, and childhood abuse further

heighten psychological distress in women with IBS. Chronic stress activates the hypothalamic-pituitary-adrenal (HPA) axis, resulting in hypercortisolemia, which exacerbates gastrointestinal symptoms such as abdominal pain, bloating and altered bowel habits **[21]**. Neuroimaging studies show that chronic stress alters brain regions related to pain perception and emotional regulation, such as the anterior cingulate cortex and amygdala, supporting the link between psychological distress and symptom severity **[21]**. Structural changes in these regions disrupt serotonin and GABA synthesis, affecting gut function and increasing visceral hypersensitivity, which contributes to IBS persistence. Elevated cortisol and HPA axis dysregulation further aggravate symptoms and contribute to co-occurring functional disorders like fibromyalgia and chronic fatigue syndrome, both more common in women. This bidirectional relationship creates a cycle that reduces Quality of Life (QoL), leading to increased work absenteeism and social limitations for women with IBS **[7]**.

4.2.3. Sociocultural influence

Socio-cultural factors amplify the biological predispositions in women with IBS. Women face higher societal and familial expectations, juggling domestic responsibilities, caregiving duties and professional obligations, leading to chronic stress. Stress activates the **Hypothalamic-Pituitary-adrenal (HPA) axis**, raising cortisol levels, which affect gut motility and sensitivity, triggering IBS symptoms. Women often internalize stress and express it through somatic symptoms but are frequently dismissed with psychological explanations (e.g., "it's just anxiety"), rather than receiving prompt GI evaluations **[26]**. Cultural stigmas surrounding bowel issues prevent women from seeking timely medical help, leading to delayed diagnoses and treatments. Societal pressure to maintain a certain body image also promotes restrictive eating behaviors, worsening IBS symptoms. Traditional diets high in FODMAP foods contribute to symptom severity **[27]**. IBS further affects productivity and social interactions, with absenteeism and impaired work performance due to the unpredictability of symptoms. Socio-demographic factors like lower income, overcrowded living and low education have been linked to higher dyspepsia rates in the UK and North America. In Asia, dyspepsia is more common among urban adults with higher socioeconomic status (24.5%) than rural adults (14.6%) **[26]**. Urban-rural differences in IBS may result from environmental, socio-demographic and cultural factors. Rapid urbanization has led to increased consumption of animal products

and fats, linked to economic growth. Studies by Pilichiewicz *et al*. (2008) found that high-fat meals worsen symptoms in functional dyspepsia **[28]**.

4.2.4. Dietary pattern in the pathogenesis of IBS in women

Dietary habits play a significant role in the pathogenesis of IBS, particularly in India, where a majority of the population follows vegetarian diets. Over 80% of individuals with IBS report a link between their symptoms and food, with many opting for dietary modifications like gluten-free or IgG-based elimination diets, despite limited evidence supporting their efficacy **[29]**. A large cross-sectional French cohort study examining the relationship between a vegetarian diet and IBS found a higher prevalence of IBS in women compared to men (5.6% vs 4.8%). The study also indicated that stable vegetarian diets (self-reported at least three times) were associated with IBS, particularly IBS-M and IBS-D, suggesting a possible link between long-term vegetarianism and IBS. Additionally, vegetarians in the study consumed more simple and complex carbohydrates than non-vegetarians. The higher intake of carbohydrates, including monosaccharides, disaccharides, and polyols (mentioned in **Table 4**), in vegetarian diets may contribute to IBS symptoms by expanding the intestinal lumen and exacerbating discomfort **[30, 31]**. In India, traditional diets are rich in fermentable carbohydrates, fiber and spices, which can worsen IBS symptoms. Foods like lentils, chickpeas, wheat, onions and dairy are high in FODMAPs, contributing to bloating and altered gut motility **[32]**. Spices such as chili, turmeric and mustard seeds used in the preparation of gravies or curries can irritate the gut, particularly in individuals with visceral hypersensitivity **[30]**. Additionally, issues like pesticide residues, food adulteration and poor food storage practices further affect gut microbiome health, increasing the risk of gastrointestinal infections and dysbiosis, which are known IBS triggers **[33, 34]**. In urban areas, increased processed and packaged foods consumption containing preservatives, and artificial additives whereas in rural areas excessive intake of chillies also worsen IBS symptoms in women **[35]**. A randomized trial in northern India showed that a Low-FODMAP diet alleviated IBS symptoms, such as abdominal pain and bloating, especially in diarrhea-predominant IBS (IBS-D), improving overall quality of life and reducing medication needs **[16]**.

4.3. Low FODMAP diet in managing IBS among Indian women.

The term FODMAP was introduced in 2005 by researchers at Monash University in Australia, led by Dr. Sue Shepherd and Prof. Peter Gibson. The word **FODMAP** diet comes from **Fermentable oligo-, di- and monosaccharides, and polyols.**

FODMAP acronym –

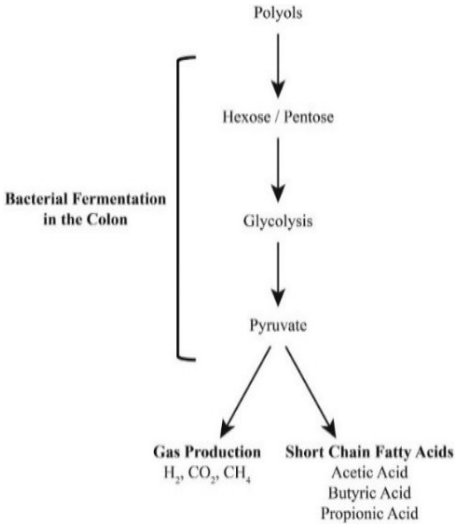
- **Fermentable** – Foods fermented in large intestines
- **Oligosaccharide** – Small chain of sugar molecules
- **Disaccharide** – Double sugar molecule
- **Monosaccharides** – a single sugar molecule
- And
- **Polyols** – Sugar alcohols.

These microscopic short chain carbohydrates have high osmotic activity. Unabsorbed FODMAP undergoes fermentation by colonic bacteria leading to bloating, flatulence and abdominal pain. Source, type and characteristic of FODMAP are summarized in **Table 5**.

In India, IBS prevalence is notable, with dietary habits influencing symptom manifestation. The Low-FODMAP diet, which reduces fermentable carbohydrates is an effective intervention. However, adapting it to Indian cuisine is challenging due to regional variations, vegetarianism, lactose malabsorption and staple foods high in fermentable carbs. Despite these challenges, studies show that the Low-FODMAP diet improves IBS-D symptoms, with short-term strict adherence followed by long-term modification being effective **[16]**. While studies on Indian women are limited, the diet's general efficacy suggests its potential benefits for women, warranting further research on gender-specific impacts in India.

Figure 2: ICMR Balanced Food Plate

Table 5: Sources, Type and Characteristic of FODMAP

FODMAP	DIETARY SOURCE-	CHARACTERISTIC
1.Fructose (monosaccharide)-	**fruits (apples, mango, pear, watermelon), vegetables such as peas, and sweeteners such as honey and high-fructose corn syrup**	**A single, small carbohydrate unit causes high osmolality, drawing water into the intestine and potentially leading to diarrhea and altered GI motility when consumed in excess.**
2.lactose (disaccharide)	**Milk and its milk products such as yogurt, cheese, and cottage cheese**	**Reduced or absent lactase activity prevents lactose breakdown into glucose and galactose, causing unabsorbed lactose to reach the colon. There, bacteria ferment it, producing SCFAs, hydrogen, and methane, leading to bloating, diarrhea, and flatulence.**
3.fructans and galactans (oligosaccharide)	**Fructans are found mainly in wheat, rye, barley, and onions,while galactans such as raffinose are found mainly in legumes.**	**have the longest chain length among all the other FODMAPs**
4.Sugar alcohols (sorbitol, maltitol, mannitol, xylitol, and isomaltose)	**Common sources of polyols include apples, cauliflower,mushrooms, pears, and peas. They are also used as artificial sweeteners in sugar-free tablets, chewing gums, and mints.**	

4.3.1. EFFICACY OF LOW FODMAP DIET IN INDIAN FOOD PLATE-

Survey from National Institute of Nutrition (NIN), National Nutrition Monitoring Bureau (NNMB) showed that India's traditional healthy diet is being replaced by processed foods, leading to rising non-communicable diseases. To address this, ICMR-NIN introduced the **Balanced Food Plate**, promoting dietary diversity and balanced nutrients. The **"My Plate for the Day"** model provides a 2000 kcal guideline for all individuals, ensuring a variety of food groups for overall health and specific needs.

However, with some modifications and ingredient substitutions, it is possible to enjoy a variety of delicious low FODMAP Indian dishes. Here are some general modification of 'My plate for the Day' based on Low FODMAP diet.

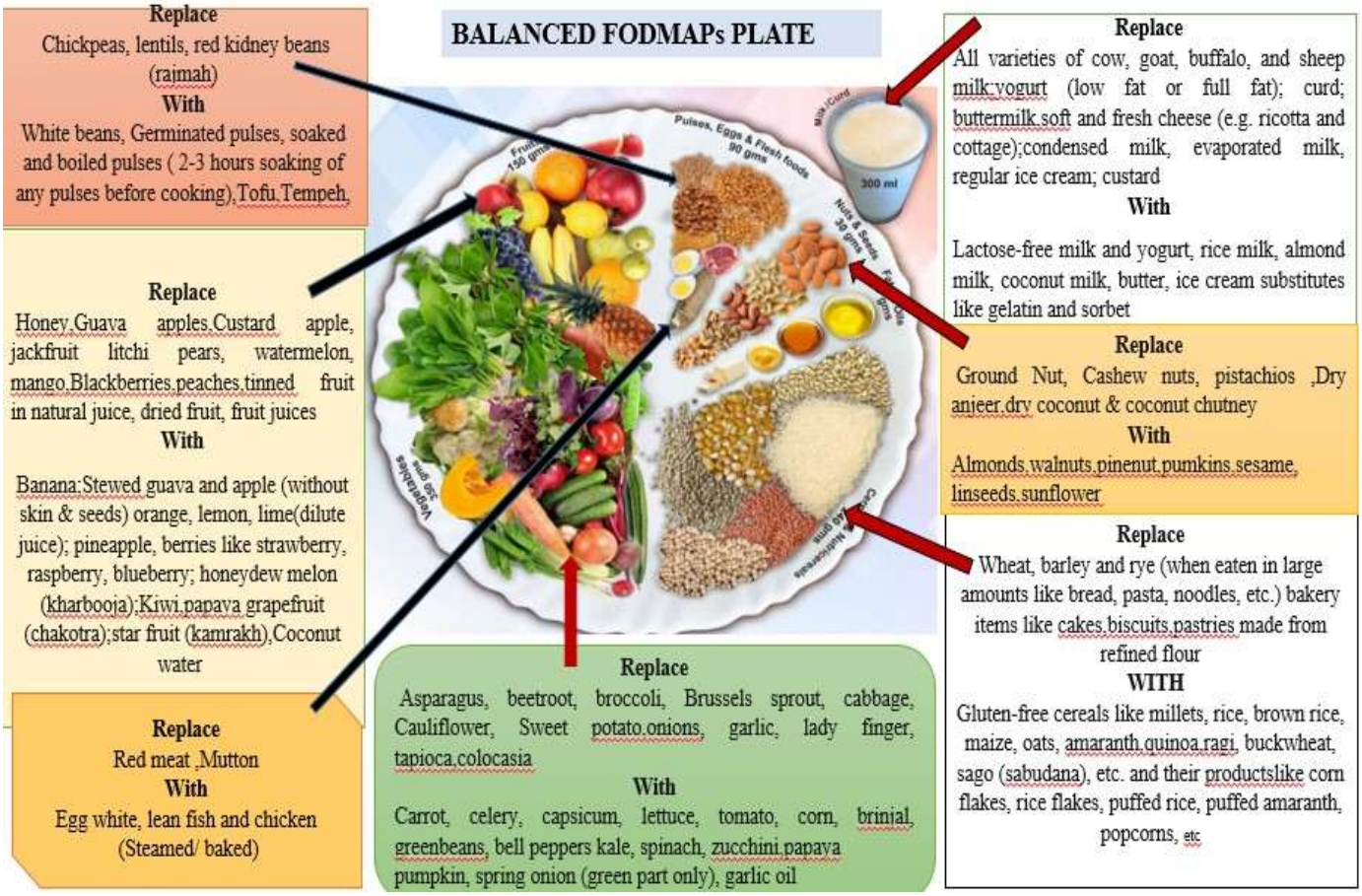


Figure 3: Balanced Low FODMAPS Plate

4.4. Sustainable Dietary Management for IBS in Women

Sustainable management of IBS in women necessitates a multidisciplinary approach that addresses the gastrointestinal, psychological and hormonal factors contributing to the condition. A sustainable approach includes-

- ❑ Low-FODMAP diet, **[37]**
- ❑ In long run need culturally adapted meal plans that ensure nutritional adequacy
- ❑ Healthcare strategies should incorporate
  - ✓ local food alternatives,
  - ✓ patient education and
  - ✓ gender-specific interventions as hormonal influences also contribute to symptom severity in women **[3]**.
- ❑ Additionally, a gluten-free diet and the Mediterranean diet have demonstrated efficacy in improving IBS symptoms, with the latter emphasizing nutrient-dense foods rich in anti-inflammatory compounds and beneficial fats **[21]**.
- ❑ diet diversity

- Incorporating soluble fiber, such as psyllium has shown promise in improving constipation and overall IBS symptoms.

5. CONCLUSION

IBS disproportionately affects women due to a complex interplay of biological, hormonal, psychological and sociocultural factors. Region-specific research highlights dietary variations, lifestyle factors and healthcare accessibility as key determinants in symptom management.

The low-FODMAP diet has emerged as an effective strategy for symptom relief, but its long-term sustainability depends on cultural dietary preferences and nutritional adequacy. Studies emphasize that personalized dietary interventions tailored to regional food availability and gut microbiome composition enhance compliance and effectiveness **[36]**.

Moreover, sustainable dietary strategies should integrate fiber diversity, mindful eating practices to support gut health while maintaining environmental and economic feasibility **[37]**. Future research should focus on developing culturally adaptable dietary guidelines, considering the role of traditional foods and socioeconomic barriers.

A multidisciplinary approach involving dietitians, gastroenterologists and behavioral therapists is crucial for optimizing IBS management in women worldwide.

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