

# Food Pyramid and its Impact in Patients with Inflammatory Bowel Disease

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## Introduction

A food pyramid is a recognized dietary tool that is shaped like a pyramid and advises people to consume more food and drink at the base of the pyramid and less at the top. According to the food pyramid, all 5 foods and beverages—breads, grains, spaghetti, wheat, vegetables and fruits, milk products, poultry, seafood, veggies, poultry, and meat; and alcohol, fats, and sugars—rose in horizontal tiers, starting at the bottom and moving up (Figure 1). The representation of food groups as rising vertical bars highlights their accurate food group connections [1]. In UC, the inflammatory reaction is constant and only localized to the colonic mucosa. In contrast to UC, CD manifests as transmural inflammation and transitory lesions throughout the digestive system. More than 163 loci linked with greater susceptibility to IBD have been found by genome-wide association studies, mapping a group of genes that control IBD-related activities such as pathogen identification, lymphocyte activation, and intestinal epithelial defense. With up to 0.5% of the population affected, IBD is no longer considered an uncommon condition. IBD is linked to a number of environmental variables, including poor nutrition, smoking, prescription usage (NSAIDs and oral contraceptives), geographical area, and socioeconomic standing, according to epidemiological and clinical research [2].

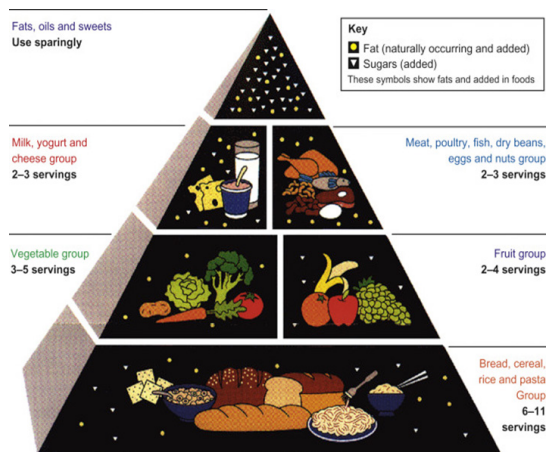


Figure 1: Food pyramid presenting the grouping of foods based on their dietary requirements.

Prevalence increases with acceptance of a European diet and lifestyle, which is typical of populations in emerging nations. Nutritional intervention complements conventional therapies and cannot be used as a sole source of treatment methods. Although it's a frequent practice among many IBD patients, dietary restriction during remission is not recommended by the many gastroenterology organizations that have published IBD recommendations [3]. To satisfy the unique nutritional needs of youngsters, the elderly, vegetarians, and a number of other populations, extra pyramids have been created. Tyrosine, threonine, leucine, isoleucine, lysine, methionine, phenylalanine, valine, and histidine are the nine amino acids that are fundamental to human nutrition. Tyrosine and cystine should be included when assessing the nutritional benefit of dietary proteins since they are both crucial components of human nutrition. The vital amino acids tyrosine and cysteine are present in significant concentrations in the majority of meat and meat products. Several epidemiological studies, albeit not all of them, have connected eating red meat to colon cancer. In both human and animal models, fiber has been proven to provide a wide range of health advantages, including the maintenance of healthy cholesterol levels, gastrointestinal health, glycemic index, and satiety adiposity (as determined by body mass index). a symptom of an IBD illness with a milder course [4]. The comparatively high percentage of obese individuals upon diagnosis may be connected to the overall population's rise in obesity brought on by early detection of IBD. Children suffer from malnutrition and have altered body composition as a result of their reduced energy consumption during illness [5]. Protein enteropathy can cause a ruptured, leaky gut, which can lead to nutritional loss.

## Environmental Factors and Nutritional Factors

IBD incidence is influenced by a number of poorly understood causes. IBD is impacted by intricate interactions among environmental influences, changes in intestinal flora, diverse genetic predispositions, and immune system alterations [6, 7]. Smoking has a well-established effect on the onset of IBD [8]. Active smoking is an environmental component that has two different effects on morbidity. By raising the chance of developing CD, it could protect against UC [5, 9]. As a result, nursing could be a defense mechanism against IBD. Before they were sick, CD patients were found to consume more monosaccharides. The onset



of CD or UC was not linked to total nutritional consumption of simple or complex carbohydrates or starches in a significant multicenter trial. IBD Anti-Inflammatory Diet (IBD-AID) and Specific Carbohydrate Diet (SCD) [10]. Fruits that include fructose (a monosaccharide), lactose (a disaccharide), galactans (an oligosaccharide), and polyols are examples of the FODMAPs, which are short-chain fermentable carbohydrates that are present in many meals. Its consumption enhances the transfer of water and readily fermentable substrates into the proximal colon and distal small intestine, likely leading to luminal edema and functional bowel complaints [11]. Patients with CD may benefit from the SCD and other low-complex-carbohydrate diets as a form of therapy. Those with IBD may experience dysbiosis in a friendlier bacterial environment thanks to these diets.

Oats and other grains that may ferment were also consumed. Because probiotics utilize them as substrates, probiotics are well taken and can help control bowel density and regularity. The monosaccharides that are permitted in the initial diet improve absorption from the gut without additional enzymatic breakdown, decreasing the likelihood of mucositis. Although both IBD and coeliac disease are immune-mediated conditions marked by persistent intestinal inflammation, neither condition is significantly linked with the other or with other naturally resistant conditions. The majority of the clinical symptoms are likely the result of intestinal target organ activity. Fiber, minerals (including vitamins C and E and folate), and phytochemicals are all abundant in fruits and vegetables (such as carotenoids, phenols, isoflavones, and indoles). Citrus fruits, fruit juices, and vegetables can help lower your chance of developing either condition, and there is a negative correlation between eating bran and getting CD. Moreover, it has been claimed that the health benefits of carrots, yams, and parsnips are virtually as excellent. Flavonoids in bergamot juice extract have anti-inflammatory and radical-scavenging characteristics that have sparked interest in their usage as therapeutic agents to treat IBD. Mucous membranes and systemic immunity are significantly influenced by the gut microbiota, and the immune response is also involved in regulating the host microbiota's makeup. This is seen in CD and UC, where dietary components affect the gut microbiota and how it affects human health. Probiotics and prebiotics are interesting ways to prevent or treat diseases like IBD. Yogurt is a fermented milk made from dough that consists of various probiotics that can colonize the gut [12]. Yogurt also had a positive effect on acute intestinal inflammation in UC and CD in mice by regulating T-cell expansion and modulating Toll-like receptor (TLR) expression by reducing TLR4(+) and TLR9(+) cells. This result was achieved by an increase in immunoglobulin A (IgA) cells, a decrease in the CD8 population, and the induction of death in colonic invading cells. Because of this intriguing *in vitro* and animal model research, several human investigations using yoghurt or fermented milk have been carried out. Fermented milk is also an excellent substrate because of its anti-inflammatory qualities. When compared to low-effect controls, probiotic yogurt consumption was linked to measurable anti-inflammatory effects and an expansion of the peripheral pool of putative Treg cells in IBD patients. The intervention considerably decreased the mean endoscopic inflammation score in UC/IPAA patients [13]. In conclusion, two servings of yoghurt or cultured dairy each day (125 ml) have been recorded since they are both great sources of protein and bioactive substances with immunomodulatory effects.

Common legumes are a good source of fiber, carbohydrates, protein, and phenolic chemicals that have anti-inflammatory and antioxidant properties. These properties may help treat intestinal illnesses like IBD. Legumes of various kinds have been used to demonstrate either beneficial or adverse impacts on IBD symptoms. The impacts varied

from roughly a 15% rise in symptoms but a 9% decrease in problems from green beans to 40% expressing an increase in symptoms but only 5% finding tolerance from frozen beans, according to their findings. Consuming beans when suffering from colitis appears to lessen the severity of the condition and the damage to the colon's histology, enhance the expression of genes (Muc1-3, Relm, and Reg3) that support barrier function, and decrease inflammatory cytokines (TNF-, IL-1, IL-6, and IFN) in the colon and bloodstream. In order to boost various factors that simultaneously support digestive health, taking the legumes before the onset of illness will lessen the severity of colitis [14]. Lastly, it is advised to determine whether vegetables are bearable while considering various cooking techniques and, if so, to consider eating peeled or smooth veggies up to 2–3 times per week if they are.

## Conclusion

The food groups on the food pyramid are separated into those that should be consumed daily, infrequently, once, twice, or four times a week. Two pennants, one red for IBD patients who require customized vitamin D, omega-3 fatty acid, calcium, and probiotic supplements, and the other black for those who must completely avoid specific foods, including alcohol and lactose-containing meals, are located at the summit of the pyramid [15].

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