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Diet and Inflammatory Bowel Disease

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Dedicatória

À Mariquinhas e à avó Cândida.

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Abstract

Introduction: Inflammatory bowel disease (IBD) is a growing health concern worldwide. While diet has been studied as a risk factor and treatment for the condition, there are currently no clear dietary recommendations for IBD patients.

Aims: To gather and summarize the most relevant and updated data concerning diet and IBD.

Methods: Review the published literature in PubMed, EBSCO, Cochrane Central Register of Controlled Trials, and Cochrane Database of Systematic Reviews between 2013 and 2024. Case-control studies, cohort studies, clinical trials, systematic reviews, meta-analyses, and guidelines were preferred. Studies of interest for full-text analysis were selected according to the information in titles and abstracts.

Results: Fiber and proteins should not be restricted in IBD patients. However, IBD patients should limit their meat consumption and replace it with other protein sources like dairy products. A diet high in fruits, vegetables, and healthy fats like olive oil, while limiting trans fats and n-6 PUFA, can lower the risk of developing IBD. Curcumin supplementation may help induce remission. A low FODMAP diet can relieve functional gastrointestinal symptoms. A balanced Mediterranean diet (MedDiet) can reduce inflammation and provide other health benefits like reducing metabolic syndrome and the risk of colorectal neoplasm in IBD patients. The MedDiet may even reduce the risk of IBD.

Conclusions: MedDiet has been identified as the most suitable choice for IBD. Further research is necessary to comprehend the effects of diet on IBD and enhance patient management and quality of life.

Keywords

Diet;Inflammatory Bowel Disease;Crohn´s Disease;Ulcerative Colitis;Nutrition

Resumo

Introdução: A doença inflamatória intestinal (DII) é um problema de saúde crescente, mundialmente. Embora a dieta tenha sido estudada como fator de risco e tratamento para a doença, atualmente não há recomendações dietéticas claras para pacientes com DII.

Objetivos: Reunir e resumir os dados mais relevantes e atualizados sobre dieta e DII.

Métodos: Revisão da literatura publicada no PubMed, EBSCO, Cochrane Central Register of Controlled Trials e Cochrane Database of Systematic Reviews entre 2013 e 2024. Estudos de caso-controlo, estudos de coorte, ensaios clínicos, revisões sistemáticas, meta-análises e *guidelines* foram preferidos. Os estudos de interesse para análise do texto completo foram selecionados de acordo com as informações contidas nos títulos e resumos.

Resultados: Fibras e proteínas não devem ser restringidas em pacientes com DII. Contudo, pacientes com DII devem limitar o consumo de carne e substituí-la por outras fontes de proteína, como laticínios. Uma dieta rica em frutas, vegetais e gorduras saudáveis como o azeite, que limite as gorduras trans e os ácidos gordos polinsaturados n-6, pode reduzir o risco de desenvolver DII. A suplementação de curcuma pode ajudar a induzir a remissão. Uma dieta baixa em oligossacarídeos, dissacarídeos, monossacarídeos e polióis fermentáveis pode aliviar os sintomas gastrointestinais funcionais. Uma dieta mediterrânea equilibrada (MedDiet) pode reduzir a inflamação e proporcionar outros benefícios à saúde, nomeadamente a redução do síndrome metabólico e o risco de neoplasia colorretal em pacientes com DII. A MedDiet pode até reduzir o risco de DII.

Conclusões: MedDiet foi identificada como a escolha mais adequada para DII. Pesquisas adicionais são necessárias para compreender os efeitos da dieta na DII e melhorar a gestão e a qualidade de vida do paciente.

Palavras-chave

Dieta;Doença Inflamatória Intestinal;Doença de Crohn;Colite Ulcerosa;Nutrição

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Abbreviations List

95%CI	95% confidence interval
AID	Anti-inflammatory diet
CD	Chron´s disease
CRP	C-reactice protein
ESR	Erythrocyte sedimentation rate
FC	Fecal calprotectin
FODMAP	Fermentable oligosaccharides, disaccharides, monosaccharides, and polyols
HR	Hazard ratio
IBD	Inflammatory bowel disease
IBS	Irritable bowel syndrome
LFD	Low fermentable oligosaccharides, disaccharides, monosaccharides, and polyols diet
MedDiet	Mediterranean diet
MUFA	Monounsaturated fatty acid
OR	Odds ratio
PUFA	Polyunsaturated fatty acids
RCT	Randomized controlled trial
RR	Risk relative
SCD	Specific carbohydrate diet
SMD	Standardized mean difference
TGF-β	Transforming growth factor-beta
UC	Ulcerative colitis
UPF	Ultraprocessed food

Introduction

Inflammatory Bowel Disease (IBD) is a chronic condition that causes inflammation in the gastrointestinal tract. It includes both Crohn's disease (CD) and ulcerative colitis (UC), with periods of remission and recurrence. In CD, inflammation can occur in any part of the gastrointestinal tract, whereas in UC, the inflammation is limited to the rectum and colon. Common symptoms include diarrhea, abdominal pain, and rectal bleeding. In up to 15% of cases, it is impossible to distinguish between CD and UC, which is known as indeterminate colitis (1).

IBD has emerged as a global disease with accelerating incidence in industrialized countries. In North America and Europe, over 1.5 million and 2 million people suffer from IBD, respectively (2).

The etiology of IBD is not yet well established, but it is considered a multifactorial disease. It seems to result from a complex interplay between genetic susceptibility, dysbiosis, and environmental/lifestyle factors such as smoking, physical activity, and diet (1).

The scientific community has extensively explored the relationship between diet and IBD. This growing interest is shared by patients who frequently ask their physicians about dietary recommendations. Patients with IBD tend to adopt unbalanced diets and restrict many foods as a response to their symptoms or beliefs, which increases the risk of malnutrition and nutrient deficiencies. Moreover, these approaches have a significant psychosocial impact as anxiety related to dietary beliefs and behaviors reduces the pleasure of eating and appetite (3).

Currently, there are no clear dietary recommendations that can be successfully applied to patients suffering from IBD. To clarify this topic, we proposed to perform a literature review about IBD and diet. A literature search in PubMed, EBSCO, Cochrane Central Register of Controlled Trials, and Cochrane Database of Systematic Reviews was conducted to identify studies of interest. The search query for PubMed was: (("Inflammatory Bowel Disease*" OR "Ulcerative Colitis" OR Crohn's Disease [MeSH Terms]) AND (Diet OR "Diet Therapy" OR Food OR Nutrition OR dietary OR "Dietary Pattern*" OR "Nutrition Assessment" OR "Nutritional Index" OR "Nutrition Disorders") NOT (Microbiology OR Microbiota* OR Microbiome* OR Biota) NOT (“Parenteral Nutrition”) NOT (“Enteric Nutrition”)). This query was adapted to fit the other databases. The research was limited to articles written in English or Portuguese published between 2013 and 2024. Case-control studies, cohort studies, clinical trials, systematic reviews, meta-analyses, and guidelines were preferred. Studies of interest for full-text analysis were selected according to the information in titles and abstracts.

Food components

Fiber

Dietary fiber can be divided into two categories based on their solubility: soluble and insoluble fibers. Soluble fibers are found in oat bran, barley, beans, lentils, peas, and some fruits and vegetables. Insoluble fibers are in wheat bran, whole grains, nuts, and seeds. The World Health Organization recommends consuming at least 25 grams of dietary fiber daily (4). The recommended dietary fiber intake for patients with IBD is the same as the general population guidelines (5). However, around 80% of IBD patients do not meet the recommended daily fiber intake (5). Some patients avoid consuming fiber because they think it can lead to gastrointestinal issues such as abdominal cramps, bloating, and diarrhea (6).

According to a long-term prospective study, consuming a median of 24.3 grams of fiber per day may lower the risk of developing CD (hazard ratio (HR) 0.59, 95% confidence interval (95%CI) 0.39-0.90, p=0.08) (7). This study found that fiber derived from fruits appeared to have the most significant effect on risk reduction. In contrast, fiber from cereals, whole grains, or legumes did not show any significant effect (7). This suggests that the health benefits of fiber may vary depending on the type of dietary fiber consumed, indicating that soluble fibers may provide greater advantages for individuals with IBD. Interestingly, another cohort study also found that smoking might reduce the protective role of fiber (8). In a meta-analysis, no significant association was found between the consumption of fiber through diet and the likelihood of developing UC (risk relative (RR) 1.09, 95%CI 0.88-1.34, I^2 0%) (9).

According to a systematic review, dietary fiber intake can be effective in maintaining and increasing remission rates in IBD patients who achieved clinical remission with conventional therapies (6). Additionally, a high intake of dietary fiber has been linked to lower levels of C-reactive protein (CRP) (10). Authors recommend high fiber intake for IBD patients, except those with intestinal stenosis, as consuming insoluble fiber can exacerbate occlusive symptoms by increasing fecal waste (6). Nonetheless, conscientious mastication, proper processing and cooking of fruits and vegetables into a texture easier to digest, may potentially assist IBD patients with concomitant intestinal strictures integrating a greater diversity of plant-based foods and fiber in their diets (11).

To summarize, it is recommended to consume more than 25 grams of fiber per day, especially from fruits. This is because it can lower the risk of developing CD and assist in achieving and maintaining clinical remission in all IBD patients. Fiber supplements can be considered to reach the daily fiber intake goal, as it may be easier for some patients to increase their fiber intake rather than modify their dietary habits.

Proteins

A systematic review and meta-analysis of cohort studies found no association between total dietary protein intake and IBD risk (RR 1.22, 95%CI 0.88–1.69, p=0.22) (12). Globally, there was no association found between consuming animal protein from various sources (including red meat, processed meat, poultry, fish, and eggs) and the risk of developing IBD (RR 1.23, 95%CI 0.81–1.86, p=0.34) (12). However, meat intake and IBD risk were directly related (RR 1.38, 95%CI 1.13-1.68, p=0.001) (12). Every 100 grams of daily meat intake increased IBD risk by 38% (12). A cohort study showed that the consumption of red meat, poultry, and processed meat, might be linked to a mild increased risk of developing UC (odds ratio (OR) 1.11, 95%CI 1.01-1.20, p=0.023) (13). A cross-sectional study suggested that high meat consumption may slightly increase the risk of active IBD, but the association was not statistically significant (OR 3.61, 95%CI 1.15–11.38, p=0.09) (14). A randomized controlled trial (RCT) showed that consuming high amounts of red meat (1.28 oz/day) resulted in moderate to severe relapses in 62% of individuals compared to 42% in the low meat group (0.65 oz/day) (15). However, reducing red and processed meats did not decrease symptomatic CD relapse risk (15). Furthermore, the high meat group had higher levels of FC, but the difference was statistically insignificant (p=0.13) (15). According to a clinical guideline, a diet low in red and processed meat may help reduce UC flares, but there is no evidence linking it to CD (11). Interestingly, protein intake from dairy products was significantly associated with a lower risk of IBD (RR 0.81, 95%CI 0.72-0.90, p<0.001) (12).

To summarize, it is not recommended to restrict total dietary protein intake. However, individuals with IBD should reduce their overall meat consumption and consider replacing it with other protein sources, such as dairy products, which have been shown to have benefits. For those with UC, it may be beneficial to limit their consumption of red and processed meat. In regard to CD, the available evidence is inconclusive, but current data does not suggest a need to restrict meat intake. However, there is conflicting information on this topic.

Polyphenols

Polyphenols are natural antioxidants found in various plant-based foods like vegetables, fruits, cereals, seeds, grains, and tea (16, 17). Anthocyanins (the broader class of polyphenols) are especially abundant in bilberries, cranberries, red, blue, blackberries, and pomegranates. In a pilot trial, UC patients taking 840 mg of anthocyanins daily showed a significant reduction in fecal calprotectin (FC) and a decrease in total Mayo score (p<0.05). Moreover, 63% of patients achieved remission, while 91% showed decreased clinical activity. When the intake of anthocyanin was discontinued, it resulted in an increase in disease activity and FC levels (18).

An RCT demonstrated that supplementation with 500 mg of resveratrol (a polyphenolic compound found in grapes, berries, and peanuts) can significantly reduce tumor necrosis factor-alpha (TNF-α) and CRP levels in patients with UC (p<0.001). Furthermore, the quality of life of these patients improved significantly, and there was a marked decrease in clinical colitis activity (p<0.001) (16). Another RCT also showed that supplementation with 500 mg of resveratrol was linked to a reduction in oxidative stress in UC patients (p<0.001) (19).

However, no associations were found between total dietary polyphenol intake and the risk of developing CD (OR 0.70, 95%CI 0.33-1.49, p=0.17) or UC (OR 1.52, 95%CI 0.88-2.63, p=0.16). Flavones and resveratrol were associated with reduced risk of developing CD (OR 0.33, 95%CI 0.15-0.69, p=0.03, and OR 0.47, 95%CI 0.25–0.90, p=0.02, respectively), but no association was found with UC (17).

In sum, polyphenols, particularly resveratrol, combined with conventional IBD medication, may help maintain clinical remission, but their preventive effects on the onset of the disease are unclear.

Dietary fats

According to a systematic review and meta-analysis, there is no significant correlation between the intake of total dietary n-3 polyunsaturated fatty acids (PUFA) and the risk of IBD (pooled effect size 1.17, 95%CI 0.80–1.72, p=0.41) (20). However, intake of long-chain n-3 PUFA was significantly associated with a lower risk of UC (pooled effect size 0.75, 95%CI 0.57–0.98, p=0.03), while no association was found between long-chain n-3 PUFA and CD risk (pooled effect size 0.85, 95%CI 0.59–1.23, p=0.37) (20). The intake of short-chain n-3 PUFA did not demonstrate any association with the risk of IBD. This suggests that the beneficial impact of n-3 PUFA on IBD is primarily driven by long-chain n-3 PUFA (20). Another systematic review and prospective cohort study found that there is a negative relationship between the ratio of n-3/n-6 PUFA and the risk of UC (HR 0.69, 95%CI 0.49-0.98, p=0.03) (21). This indicates that the protective effect of long-chain n-3 PUFA is the primary factor behind the association, rather than high intake of n-6 PUFA, which showed no association with IBD incidence (HR 1.08, 95%CI 0.77-1.52, p=0.71) (21). Additionally, a high intake of trans unsaturated fatty acids over the long term was associated with a trend towards an increased incidence of UC (HR 1.34, 95%CI 0.94-1.46, p=0.07), but not CD (p=0.19) (21). According to another cohort study, a higher intake of oleic acid, a n-9 monounsaturated fatty acid (MUFA), was significantly associated with a lower risk of developing UC (OR 0.03, CI 0.002–0.56, p=0.03) (22).

An RCT found that taking 2 grams of eicosapentaenoic acid (the primary component of n-3 fish oil) daily for 6 months with UC drug therapies resulted in a 100-point reduction in FC for 63.3% of patients (OR 12.0, 95%CI 3.12-46.24, p<0.001) (23). Also, 76.7% of patients maintained clinical remission, compared to 50% in the placebo group (OR 3.29, 95%CI 1.08-9.95, p=0.035) (23). Moreover, a meta-analysis found that consuming fish may be slightly associated with a reduced risk of IBD (pooled effect size 0.68, 95%CI 0.46-1, p=0.05) (20). Similarly, a prospective cohort study concluded that taking fish oil supplements may be associated with a 15% lower risk of UC (HR 0.85, 95%CI 0.75-0.99, p=0.02) (24). Further, fish oil intake was found to be significantly linked to lower CRP levels in IBD patients (p<0.001) (24).

An RCT showed that a 12-week daily intake of 30 grams of grounded flaxseed and 10 grams of flaxseed oil resulted in significant improvements in UC patients. These included reduced FC, Mayo score, and erythrocyte sedimentation rate (ESR), along with an increase in

transforming growth factor beta (TGF-β) and quality of life (p<0.001) (25). No significant difference was found between the two forms, except for TGF- β, where grounded flaxseed was more effective (25).

A clinical trial showed that consuming 50 mL of extra virgin olive oil daily for 20 days led to a significant decrease in ESR, CRP, bloating, constipation, and fecal urgency among patients suffering from UC (p<0.05) (26).

In summary, consuming n-3 PUFA can help reduce the risk of developing IBD, specifically UC. Conversely, n-6 PUFA and trans fatty acids increase the risk of IBD and should be discouraged. Olive oil and oleic acid have a positive impact on IBD patients, while grounded flaxseed and flaxseed oil are also beneficial. Supplementation with fish oil requires more research before being recommended.

Curcumin

According to a meta-analysis of RCTs, a low dose of oral curcumin supplementation (450 mg per day) was ineffective in inducing clinical and endoscopic remission or clinical improvement in UC patients (p>0.05). This study also showed that curcumin supplementation for 3 months resulted in better endoscopic remission and clinical improvement compared to 6 weeks (27).

In an RCT, an 8-week supplementation of 1500 mg of oral curcumin taken three times a day, resulted in clinical remission in 83.9% of UC patients (p=0.001). Improvement was noted in 93.5% of patients, with better quality of life and reduced ESR and CRP levels (p<0.05) (28). Similarly, another RCT found that 65.3% of patients who took 3 grams of oral curcumin with continued drug therapy achieved a clinical response (OR 13.2, 95%CI 3.1-56.6, p<0.001), and 38% achieved endoscopic remission (OR 20.7, 95%CI 1.1-393, p=0.043) (29). In a separate RCT, 12 weeks of Theracurmin® (360 mg/day) supplementation with standard treatment improved clinical remission (p=0.020) and endoscopic activity (p=0.032), achieving endoscopic remission in 15% of CD patients (30).

In sum, curcumin can be an effective supplement to standard drug therapy for IBD patients. Daily doses of 1500-3000mg for at least 3 months can help induce clinical and endoscopic remission without any apparent adverse effects.

Saffron

An RCT has shown that an 8-week supplementation with 100 mg per day of saffron tablets can improve the clinical activity (p=0.004) and antioxidant capacity (p=0.016) of UC patients (31). Another study found that 8-week supplementation with 100 mg of saffron per day led to a significant reduction in serum levels of TNF-α, CRP, and ESR, and a significant increase in the quality of life of UC patients (p<0.05) (32).

Saffron supplementation may improve the quality of life and decrease inflammatory markers in individuals with UC. However, more research is needed to support these findings.

Ginger

According to an RCT, ginger supplementation (2 grams per day for 12 weeks) improved quality of life and reduced malondialdehyde (oxidative agent) in UC patients (p<0.005), but did not affect serum total antioxidant capacity (33). A systematic review showed that ginger supplementation increased antioxidant capacity (standardized mean difference (SMD) 0.40, 95%CI 0.06-0.73, I^2 42.8%) and decreased malondialdehyde (SMD 0.69, 95%CI 1.26-0.12, I^2 85.8%) (34).

This suggests that supplementing with ginger may be a beneficial additional treatment for individuals with UC. However, further research is necessary.

Coconut water

Based on the results of an RCT, the consumption of 400 mL of coconut water per day, along with standard medical therapy, showed a significant improvement in clinical response and remission in UC patients (p<0.05). Furthermore, it also led to a significant reduction in FC in patients suffering from mild to moderate UC (p=0.003). However, there was no significant improvement or remission observed in endoscopic results (p>0.05) (35).

This RCT suggests that adding coconut water to daily dietary habits may have benefits in UC patients, however, further research is required.

Dietary patterns

Low FODMAPs diet

A low fermentable oligosaccharides, disaccharides, monosaccharides, and polyols (FODMAP) diet (LFD) is commonly used for patients with irritable bowel syndrome (IBS) (36). According to a systematic review, LFD significantly reduced overall gastrointestinal symptoms such as abdominal bloating (OR 0.10, 95%CI 0.06-0.16, $p<0.00001$), abdominal pain (OR 0.24, 95%CI 0.16-0.35, $p<0.00001$) and nausea (OR 0.51, 95%CI 0.31-0.85, $p=0.009$) in patients with IBD (37). However, another systematic review found no significant differences in stool consistency, quality of life, Mayo score, FC, and CRP, and no improvement in mucosal inflammation in IBD (36).

In sum, LFD helps alleviate gastrointestinal symptoms in IBD patients but it does not affect inflammatory disease activity. Therefore, the use of LFD should be limited to IBD patients in remission with a concurrent diagnosis of IBS, and guidance from a trained dietician is essential to avoid unnecessary restrictions and maintain a balanced diet.

Mediterranean diet

Two large prospective cohort studies found that Mediterranean diet (MedDiet) was linked with a lower risk of developing CD ($p=0.03$), but not UC ($p=0.61$) (38). A clinical trial showed that MedDiet can improve the quality of life of individuals with IBD, reducing disease activity, and lowering levels of CRP and FC in UC and CD patients ($p<0.05$) (37). Moreover, the MedDiet has been deemed beneficial in treating the complex nature of IBD, which not only affects the intestine but also has extraintestinal manifestations. Adhering to this diet can lead to a reduction in liver steatosis, body mass index, and waist circumference ($p<0.05$) (39). The MedDiet has the added benefit of effectively reducing the consumption of ultraprocessed food (UPF). UPF contains high levels of sugar, salt, food additives, and saturated and trans fats. A prospective cohort study shows that UPF is associated with the development of IBD, particularly CD (HR 2.00, 95%CI 1.32-3.03, $p=0.001$). In individuals with a pre-existing diagnosis of IBD, UPF is linked to an increased need for surgery (HR 4.06, 95%CI: 1.52-10.86, $p=0.005$) and an increased risk for colorectal neoplasm (HR 3.21, 95%CI: 1.15-8.98, $p=0.01$) (40). Considering these findings, an expert clinical guideline recommends MedDiet to all patients with IBD and advises them to avoid consuming sugar-sweetened beverages (11).

In sum, MedDiet has been found to be effective in improving the symptoms, and quality of life, and decreasing inflammatory biomarkers of patients with IBD. Moreover, it has been shown to reduce the risk of CD. The MedDiet offers a comprehensive approach to manage IBD, not only by treating luminal inflammation but also by addressing nutritional deficiencies and

extraintestinal complications. Therefore, this diet is a recommended choice for all patients with IBD.

Specific carbohydrate diet

The specific carbohydrate diet (SCD) is based on the idea that people with IBD have trouble digesting disaccharides and amylopectin. These are sugars found in certain foods that require specific enzymes to be broken down and absorbed. The SCD only includes simple sugars (monosaccharides) as a source of carbohydrates and excludes most complex sugars (disaccharides and polysaccharides) (41). A 12-week study comparing SCD to MedDiet on CD patients found that 42.4% achieved symptomatic remission, 26.1% had FC response, and 10.8% had CRP response. However, these results were not significantly better than those on MedDiet (p=0.87, p=0.20, p=0.55, respectively) (42). In a cohort study, no significant links were observed between dietary carbohydrates and the risk of developing CD (OR 0.87, 95%CI 0.24-3.12, p=0.7) or UC (OR 1.46, 95%CI 0.62 - 3.46, p=0.41) (43).

In summary, both SCD and the Mediterranean diet showed similar efficacy in a single study assessing CD patients. However, the association between carbohydrates and CD risk is not proven. Therefore, more data is required to assess the role of SCD in IBD.

Anti-inflammatory diet

The anti-inflammatory diet (AID) suggests avoiding pro-inflammatory foods and consuming anti-inflammatory ones (44). During a 6-month RCT, it was found that 69.2% of UC patients who followed the AID achieved a subclinical response, defined as FC<150 μg/g. This proportion was significantly higher compared to the control group, where only 37% of patients achieved this outcome (p=0.002). The AID also increased micronutrient levels, including zinc (44), which may have contributed to reduce hospitalizations and induction of clinical remission in UC patients (45). According to a prospective cohort study, diets with high inflammatory potential increased the risk of CD by 51% (HR 1.51, 95%CI 1.10–2.07, p=0.01) (46). However, no significant association was established between high inflammatory diet and UC risk in a case-control study (OR 0.93, 95%CI 0.53–1.63, p=0.81) (47).

To summarize, AID seems to have a positive effect on clinical control in UC after the disease has already been established. However, it does not seem to have any significant impact on preventing UC, but it can lower the risk of developing CD. Other diets may be more effective in preventing and treating IBD.

The immunoglobulin exclusion diet

The immunoglobulin exclusion diet involves identifying foods that trigger IgG-mediated reactions, assessed through serologic investigation (41). Evidence for the effectiveness of this diet on IBD symptoms, quality of life and CRP is still limited and contradictory (41). Therefore, further studies are needed before recommending it.

Plant-based diet

According to a meta-analysis, the consumption of vegetables was inversely associated with UC risk (OR 0.71, 95%CI 0.58-0.88, I^2 41.6%), but not with CD (OR 0.66, 95%CI 0.40-1.09, I^2 67.5%). A higher intake of fruit was associated with a reduced risk of both UC (OR 0.69, 95%CI 0.49-0.96, I^2 50.7%) and CD (OR 0.57, 95%CI 0.44-0.74, I^2 59.5%) (48). In a prospective cohort study, no significant association was found between plant-based dietary patterns and the course of IBD, except for lower complication rates in CD patients (p=0.039) (49).

In sum, a plant-based diet may lower the risk of IBD. However, it may not have significant benefits once the disease is established. Other diets may be more effective and safer in treating IBD.

Conclusion and future considerations

There is growing interest in the role of diet in the development and treatment of IBD. Although several studies have been conducted on the impact of diet and food on IBD, some of them had small study group sizes and did not interrupt immunosuppressive medication, which could potentially affect the analysed outcomes. Moreover, some studies used pharmaceutical formulations such as capsules or powders to assess the impact of diet, which may not accurately reflect the outcomes produced by actual dietary consumption due to the complex dietary interactions. However, this review gathers and summarizes the most relevant and updated data about diet and IBD, and only original articles of significant scientific relevance were considered.

It is important to note that proteins and fiber should not be restricted in IBD patients, and their provision should be similar to that recommended for the general population. However, IBD patients should be advised to reduce their meat consumption and replace it with other protein sources that have demonstrated benefits, such as dairy products. A diet that is high in fruits and vegetables, n-3 PUFA, n-9 MUFA, especially through the consumption of olive oil, and low in n-6 PUFA and trans fatty acids, is associated with a reduced risk of developing IBD and should be recommended.

In addition, curcumin supplementation may be considered at a dose of 1500-3000 mg per day for at least 3 months to help induce remission. LFD may help relieve functional gastrointestinal symptoms and control IBS in patients with IBD in remission, even though it has no proven impact on the resolution of inflammation of IBD.

Based on the reviewed data, the MedDiet is the best dietary choice for individuals with IBD who are looking for a practical and evidence-based solution. Consuming a balanced MedDiet that is high in fruits, vegetables, polyphenols, and MUFA, and low in UPF and trans fats can help reduce inflammatory activity in IBD patients. Furthermore, this diet provides various health benefits beyond IBD, such as reducing metabolic syndrome and the risk of colorectal neoplasm. The MedDiet is also easier to adopt and maintain. In fact, it may even help reduce the risk of IBD, specifically CD.

More research is needed to understand the effects of diet on IBD and to improve patient management and quality of life. It is crucial to keep in mind that individuals with IBD may face the risk of malnutrition. Therefore, it is crucial to provide them with customized, multidisciplinary nutritional guidance that addresses their specific needs and helps them overcome any restrictive behaviors or beliefs they may have. This can significantly improve the overall health and well-being of IBD patients.

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