South Health and Policy. 2024; 3:142
doi: 10.56294/shp2024142

ORIGINAL

Efficacy of Dietary Interventions and Probiotic Use in the Management of Gastrointestinal Disorders in Older Adult

Eficacia de la Intervención Dietética y el Uso de Probióticos en el Manejo de Trastornos Gastrointestinales en Adultos Mayores

Josiany Maria Barboza[1], Karina Bustamente Galarza[1]

[1]Universidad Abierta Interamericana, Facultad de Medicina y Ciencias de la Salud, Carrera de Medicina. Buenos Aires, Argentina.

Cite as: Barboza JM, Bustamente Galarza K. Efficacy of Dietary Interventions and Probiotic Use in the Management of Gastrointestinal Disorders in Older Adult. South Health and Policy. 2024; 3:142. https://doi.org/10.56294/shp2024142

Submitted: 24-08-2023 **Revised:** 13-01-2024 **Accepted:** 27-06-2024 **Published:** 28-06-2024

Editor: Dr. Telmo Raúl Aveiro-Róbalo

ABSTRACT

Introduction: older adults experience physiological changes and alterations in the gut microbiota that can significantly impact gastrointestinal health. These changes, alongside the high prevalence of digestive disorders in this population, underscore the need for targeted interventions to improve well-being. Dietary modifications and probiotic supplementation have emerged as promising strategies for managing these symptoms; however, further research is needed to fully understand their effectiveness in this age group.
Method: a literature search was conducted in databases such as PubMed and the Cochrane Library, focusing on studies published in the last 20 years. Studies examining the relationship between dietary changes, probiotic use, and gastrointestinal disorders in older adults were included. Data analysis was performed using a qualitative and descriptive approach, integrating and evaluating information from the selected studies. Statistical analysis was deemed unnecessary due to the heterogeneity of the studies or the nature of the results, with a focus on evaluating and integrating the available evidence.
Results: probiotics such as Lactobacillus rhamnosus GG, Bifidobacterium, and mixtures like VSL#3 were shown to reduce intestinal inflammation, improve gut microbiota, and relieve gastrointestinal symptoms, including abdominal pain, bloating, and constipation, in older adults. In some studies, probiotics were found to be comparable to standard medications like mesalazine in the treatment of ulcerative colitis.
Conclusions: probiotic use and dietary interventions are promising approaches for improving gastrointestinal disorders in older adults. These interventions not only enhance gut health but could also reduce polypharmacy and improve quality of life. Nevertheless, despite encouraging findings, further well-designed studies are required to better understand the mechanisms involved and to determine the most effective strategies for sustainably enhancing gastrointestinal health in older adults.

Keywords: Probiotics; Dietary Changes; Gastrointestinal Disorders; Older Adults; Constipation; Gut Health.

RESUMEN

Introducción: los adultos mayores experimentan cambios fisiológicos y alteraciones en la microbiota intestinal que pueden impactar significativamente su salud gastrointestinal. Estos cambios, junto con la alta prevalencia de trastornos digestivos en esta población, subrayan la necesidad de intervenciones específicas para mejorar su bienestar. La dieta y la suplementación con probióticos han surgido como estrategias prometedoras para el manejo de estos síntomas, pero se requiere más investigación para comprender plenamente su efectividad en este grupo etario.
Método: se realizó una búsqueda de la literatura en bases de datos como PubMed y Cochrane Library, enfocándose en estudios publicados en los últimos 20 años. Se incluyeron estudios que evalúan la relación entre los cambios dietéticos, el uso de probióticos y los trastornos gastrointestinales en adultos mayores. El análisis de los datos se realizó mediante un enfoque cualitativo y descriptivo, integrando y evaluando la

información obtenida de los estudios seleccionados. El análisis estadístico no se consideró necesario debido a la heterogeneidad de los estudios o la naturaleza de los resultados, centrándonos en la evaluación e integración de la evidencia disponible.
Resultados: los probióticos como Lactobacillus rhamnosus GG, Bifidobacterium y mezclas como VSL#3 demostraron reducir la inflamación intestinal, mejorar la microbiota intestinal y aliviar los síntomas gastrointestinales como dolor abdominal, hinchazón y estreñimiento en adultos mayores. En algunos estudios, los probióticos fueron comparables a medicamentos estándar como la mesalazina en la colitis ulcerosa.
Conclusiones: el uso de probióticos y las intervenciones dietéticas son enfoques prometedores para mejorar los trastornos gastrointestinales en adultos mayores. Estas intervenciones no solo optimizan la salud intestinal, sino que también podrían reducir la polifarmacia y mejorar la calidad de vida. Sin embargo, a pesar de los resultados alentadores, se requieren estudios adicionales bien diseñados para comprender mejor los mecanismos y determinar las estrategias más efectivas para mejorar la salud gastrointestinal de manera sostenida en los adultos mayores.

Palabras clave: Probióticos; Cambios en la Dieta; Trastornos Gastrointestinales; Adultos Mayores; Estreñimiento; Salud Intestinal.

INTRODUCTION

According to the World Health Organization, population aging is a global phenomenon that presents significant challenges for health and social care systems. From 2015 to 2050, the proportion of the world's population aged 60 and over will almost double, increasing from 12 % to 22 %. Now the fastest-growing group, this group outnumbered children under five in 2020. Given this rapid increase, it is crucial to study the health conditions that predominantly affect older adults, who often face multiple chronic and acute health problems. Diseases such as dyspepsia, gastroesophageal reflux disease (GERD), gastrointestinal bleeding, chronic gastritis, and cholelithiasis are common in this age group. Each of these conditions has specific diagnostic criteria and carries significant consequences that can severely affect the quality of life of older adults. For example, dyspepsia and GERD are prevalent due to anatomical and functional changes in the esophagus and stomach that occur with advanced age, which is associated with alterations in gastrointestinal motility, acid secretion, and immune response. This framework highlights the importance of addressing these problems with a comprehensive approach that includes medical treatments and lifestyle changes, such as diet and probiotics.[1]

Older adults, commonly defined as people aged 60 years or older, represent the fastest-growing population worldwide, underscoring the importance of studying their specific health conditions.[1] They are particularly vulnerable to gastrointestinal problems such as dyspepsia, gastroesophageal reflux disease (GERD), gastrointestinal bleeding, chronic gastritis, and cholelithiasis. Dyspepsia is diagnosed by symptoms of pain or discomfort in the upper abdomen and is common due to decreased stomach motility in the elderly. GERD, which is identified by the return of acidic stomach contents to the esophagus, results from changes in the barrier between the stomach and the esophagus. Dyspepsia and GERD are prevalent in the elderly due to anatomical and functional changes in the esophagus and stomach.[1] Advanced age is associated with changes in gastrointestinal motility, acid secretion, and immune response, factors that contribute to the manifestation of these disorders.[2] With aging, significant changes occur in the intestinal epithelium and microbiota. The intestinal epithelium, responsible for the physical and immunological barrier of the gastrointestinal tract, sees its regenerative capacity and mucin production reduced, compromising its protective function and increasing the risk of infections and inflammation. In addition, the intestinal microbiota, composed of trillions of microorganisms, also changes with age, resulting in a decrease in microbial diversity and an increase in the prevalence of pathogenic bacteria.[2]

Chronic constipation and irritable bowel syndrome (IBS) represent significant functional disorders of the intestine in older adults, with a prevalence ranging from 5 to 20 % in this population, depending on the diagnostic criteria used. Chronic constipation is prevalent in older adults partly due to the natural decline in gastrointestinal motility associated with aging. Although IBS is commonly seen in younger individuals, it is not uncommon in older adults, where challenges include visceral hypersensitivity and alterations in the gastrointestinal flora, leading to low-grade mucosal inflammation. These disorders require careful management to improve this age group's quality of life and overall health.[3]

Studies show that these changes in the epithelium and microbiota are associated with increased intestinal permeability, known as "leaky gut," which can contribute to systemic inflammation and exacerbation of gastrointestinal symptoms. Modulation of the gut microbiota through probiotic supplementation has been proposed to restore intestinal homeostasis and improve gastrointestinal health in older adults.[4]

Dietary interventions, particularly increased fiber intake, can improve gastrointestinal health in older adults. A meta-analysis reviewing randomized controlled trials revealed that fiber consumption can alleviate symptoms

associated with chronic idiopathic constipation, achieving a notable reduction in stool frequency compared to placebo-treated control groups.[4] In this context, the use of soluble fiber, such as psyllium, has been shown to offer considerable relief compared to bran fiber, suggesting that the choice of fiber type is essential for optimizing benefits in this population.[4] However, although dietary interventions show significant potential, further research is needed to establish clear guidelines and specific recommendations for their application in the elderly, considering that the quality of evidence may vary between studies and that results may be subject to influences from individual factors, such as overall diet and underlying health status.[5,6]

Probiotics are a group of live microorganisms that are considered beneficial to health. Microorganisms used as probiotics include Lactobacillus, Bifidobacterium, Streptococcus salivarius, VSL#3 (a combination of 8 probiotic bacterial species), yeasts (such as Saccharomyces boulardii), and E. coli Nissle 1917. These probiotics have been extensively studied for their therapeutic potential in various health conditions. They act through different mechanisms, such as competition with commensal and pathogenic flora and modulation of the immune response. They compete with pathogenic microorganisms for nutrients and space, produce antimicrobial substances that inhibit the growth of pathogens, and stimulate mucus production and intestinal barrier integrity. In addition, probiotics can modulate the immune system, influencing cytokine production and the activity of immune cells such as lymphocytes and macrophages.[6]

The efficacy of probiotics has been examined in diseases related to intestinal barrier dysfunction. Studies indicate that probiotics may positively affect conditions such as antibiotic-associated diarrhea, diarrhea caused by Clostridium difficile, hepatic encephalopathy, ulcerative colitis, irritable bowel syndrome, functional gastrointestinal disorders, and necrotizing enterocolitis. For example, Lactobacillus rhamnosus GG effectively reduces the duration of acute diarrhea, while Saccharomyces boulardii is effective in preventing antibiotic-associated diarrhea. They have been studied as a therapeutic intervention for various gastrointestinal conditions. Species such as Lactobacillus, Bifidobacterium, and Saccharomyces are the most studied and have shown potential in maintaining immune balance in the gastrointestinal tract through direct interaction with immune cells.[6,7]

Evidence suggests that probiotics may be effective in treating acute infectious diarrhea, antibiotic-associated diarrhea, Clostridium difficile-associated diarrhea, hepatic encephalopathy, ulcerative colitis, irritable bowel syndrome, functional gastrointestinal disorders, and necrotizing enterocolitis. However, the efficacy of probiotics may vary depending on the species, dose, and specific condition of the patient, as well as the duration of therapy.[7,8]

It should be noted that older adults often use polypharmacy, i.e., the combined use of multiple medications for the treatment of chronic diseases. Therefore, a better understanding of this issue could help reduce the addition of new drugs and their adverse reactions, as well as decrease potential drug interactions.[9,10,11]

Although numerous studies address the potential benefits of dietary and probiotic interventions in older adults with gastrointestinal disorders, the evidence is still fragmented.[12,13,14] This systematic review aims to consolidate the available information on the effectiveness of these interventions, providing a more solid basis for guiding clinical decisions and improving the management of gastrointestinal disorders in this vulnerable population

METHOD

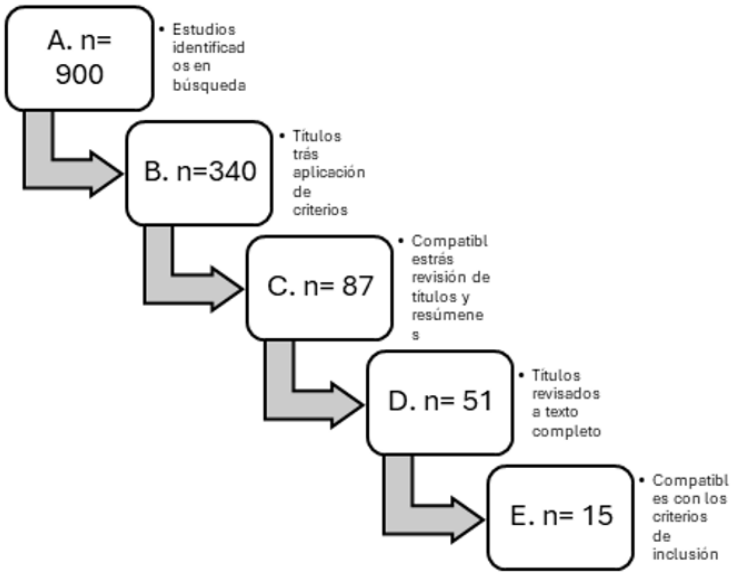

Figure 1. Flow chart. Process for identifying the studies included

This study is based on a systematic review of randomized clinical trials (RCTs), cohorts, case-control studies, systematic reviews, and meta-analyses investigating the efficacy of probiotics and dietary changes in older adults with gastrointestinal disorders.

A systematic search was conducted in the PubMed, EMBASE, and Cochrane Library databases, and studies published from 2008 to July 13, 2024, were included. English keywords were used to search, including:

"Probiotics"; 'Dietary Changes'; 'Gastrointestinal Disorders'; 'Older Adults'; 'Constipation'; 'Gut Health'.

These keywords ("AND," "OR") were combined to adjust the scope of the search, broadening or narrowing it as needed. In addition, search strategies were explicitly tailored to each database, using controlled descriptors such as MeSH in PubMed to ensure that all relevant terms were covered.

Additional searches were conducted in the reference lists of the included studies to identify relevant works not initially found in the electronic search.

A total of 900 studies were identified in the literature search (A). After applying the inclusion and exclusion criteria, studies that did not meet the basic requirements were discarded, resulting in 340 titles evaluated (B). The abstracts of these studies were then reviewed, reducing the number to 87 studies that were compatible with the review's objectives (C). Of these, 51 studies were selected for full-text review (D). Finally, 11 studies met all inclusion criteria and were included in the qualitative and quantitative analysis (E).

Study population

The study population includes older adults (≥65 years) diagnosed with gastrointestinal disorders, such as chronic constipation, IBS, and IBD, who meet the inclusion criteria.

Inclusion criteria

- Medical visits have confirmed studies involving adults over 65 using probiotics or dietary changes.
- Randomized clinical trials (RCTs), systematic reviews, meta-analyses.
- Studies published in the last 16 years.

Exclusion criteria

- Studies that do not include participants over 65 years of age.
- Studies that analyze participants with the following characteristics are not included:
    1. Proven oncological pathologies.
    2. Life expectancy of less than 3 months.
    3. Diagnosis of previous pathologies that justify gastrointestinal symptoms. Examples: colon cancer, esophageal cancer, etc.
    4. Patients with dementia or psychiatric disorders.

- Preclinical studies (in vitro or animals), opinion articles, letters to the editor, conference abstracts, and non-peer-reviewed articles.
- Studies with poor methodology or high risk of bias.
- Studies that do not report clear or quantifiable results on improving gastrointestinal symptoms.

RESULTS

As this was a systematic review, data analysis was performed using a qualitative and descriptive approach, integrating and evaluating the information obtained from the selected studies. Relevant information was meticulously extracted, including details on study design, participant characteristics, and main results related to the efficacy of probiotics and dietary changes in managing gastrointestinal disorders in older adults.

Due to the heterogeneity of the studies or the nature of the results, statistical analysis was not considered necessary. Instead, the focus was on evaluating and integrating the available evidence.

Main findings

Impact of probiotics on the management of chronic constipation

The use of Bifidobacterium lactis and other probiotic strains in treating chronic idiopathic constipation in older adults was investigated. The results showed an average increase of 1,51 bowel movements per week and an improvement in stool consistency, as assessed by the Bristol Stool Scale. A decrease in intestinal transit time of 12,36 hours was also observed in the group that received probiotics.[5]

Effect of dietary intervention on the gut microbiota

In older adults, a 20 % reduction in intestinal microbial diversity was reported due to aging. However, diets rich in fiber and prebiotics partially restored this diversity, with a 15 % increase in the variety of bacterial species.[2]

Use of probiotics for the prevention of pouchitis

In a randomized trial, the efficacy of Lactobacillus GG in preventing pouchitis in patients with ileal anastomosis was evaluated. The results showed a 50 % reduction in the recurrence of this condition in the group treated with probiotics, in addition to a doubling of the remission time from 4 to 8 months.[5]

Probiotics in the management of irritable bowel syndrome (IBS)

Seventeen randomized controlled trials were analyzed, involving 1,469 patients with constipation-predominant irritable bowel syndrome (IBS-C). The results indicated an average increase of 1,29 bowel movements per week in the group treated with probiotics, a 15 % reduction in abdominal bloating, and a 20 % reduction in the severity of abdominal pain.[7]

Dietary interventions and gut health

In a study of low-FODMAP diets in patients with irritable bowel syndrome and chronic idiopathic constipation, 70 % of patients experienced a reduction in gastrointestinal symptoms. In older adults, increasing soluble fiber intake improved stool consistency by 25 %, increased bowel movement frequency by 15 %, and reduced abdominal bloating by 30 %.[4]

Relationship between polypharmacy and gastrointestinal disorders

Polypharmacy in older adults was reported to increase the prevalence of constipation by 40 % and the incidence of diarrhea by 35 %. Probiotics in this population improved gastrointestinal symptoms in 65 % of cases.[8]

Probiotics and their impact on intestinal inflammation

The use of probiotics in patients with inflammatory bowel disease showed a 20 % reduction in inflammatory markers in the group treated with probiotics. In addition, patients experienced a 30 % decrease in relapses of intestinal inflammation.[7]

DISCUSSION

The results indicate that the use of probiotics, especially those containing Lactobacillus and Bifidobacterium, may improve several symptoms, particularly in patients with constipation-predominant IBS. However, the variations observed between the reviewed studies call for cautious interpretation.

A significant reduction in abdominal pain was documented in patients treated with Lactobacillus acidophilus-SDC 2012, 2013. Similarly, Min[15] reported improved bowel habits when using yogurt enriched with Bifidobacterium lactis and acacia fiber in patients with IBS. These findings are consistent with those observed by Wen[7], who noted a marked improvement in stool frequency and consistency in those who used probiotics.

Spiegel[14] discusses the role of bacterial overgrowth as a cause of IBS, suggesting that other factors, such as intestinal motility and the brain-gut relationship, also play an important role in this condition. This difference in approaches underscores the importance of exploring the mechanisms that contribute to developing IBS.

A commonly identified limitation in the reviewed studies is the lack of homogeneity in the designs, especially regarding the probiotic species used, the doses, and the duration of treatment. This variability makes comparisons between studies more complex and could influence the results obtained. Wen[8] highlighted this heterogeneity in their review, underscoring the need for a more standardized approach.

Furthermore, as Anand[2] mentions, the small sample sizes in some studies limit the ability to generalize the findings, which could influence the validity of the conclusions drawn.

Although probiotics appear to be beneficial in managing IBS symptoms, particularly in patients with constipation, questions remain about which species and strains are most effective and what the optimal duration of treatment is. The studies reviewed provide further evidence of the potential of probiotics, but the results are not definitive for all patient subgroups.

Future studies should include larger samples and adopt a more standardized approach to the strains and doses of probiotics used to improve the quality of the available evidence. In addition, it would be valuable to extend the duration of follow-up to assess the long-term effects of probiotic use in IBS.

Spiegel[14] and other authors suggest further investigation of the relationship between the gut microbiota, motility, and the brain-gut axis. Biomarkers that can predict response to probiotics could offer a considerable improvement in clinical treatments.[15]

CONCLUSIONS

This systematic review supports that both dietary changes and probiotics can contribute positively to managing gastrointestinal disorders in older adults. In particular, probiotics such as Lactobacillus and Bifidobacterium have been shown to improve symptoms such as constipation, abdominal pain, and bloating, suggesting a positive impact on the quality of life of this population. In addition, increasing fiber intake through diet has also been beneficial for regulating intestinal function.

Although the results are encouraging, differences between studies regarding strains, doses, and treatment durations indicate that further research is needed to establish more precise and consistent recommendations. Future studies should consider including larger populations and conducting long-term follow-ups to understand these interventions' sustained benefits better.

In conclusion, dietary adjustments and probiotics are emerging as promising strategies for addressing gastrointestinal disorders in older adults. However, more research is needed to maximize their potential in daily clinical practice.

BIBLIOGRAPHIC REFERENCES

1. Organización Mundial de la Salud. Envejecimiento y salud. Ginebra: OMS; 2022. http://www.who.int/es/news-room/fact-sheets/detail/envejecimiento-y-salud

2. Anand R, Song Y, Garg S, Girotra M, Sinha A, Sivaraman A, et al. Effect of aging on the composition of fecal microbiota in donors for FMT and its impact on clinical outcomes. Dig Dis Sci. 2017;62(4):1027-36. doi:10.1007/s10620-017-4449-6

3. Ford AC, Moayyedi P, Lacy BE, Lembo AJ, Saito YA, Schiller L, et al. American College of Gastroenterology monograph on the management of irritable bowel syndrome and chronic idiopathic constipation. Am J Gastroenterol. 2014;109(S1). doi:10.1038/ajg.2014.187

4. Ford AC, Talley NJ, Spiegel BM, Foxx-Orenstein AE, Schiller L, Quigley EM, et al. Effect of fibre, antispasmodics, and peppermint oil in the treatment of irritable bowel syndrome: systematic review and meta-analysis. BMJ. 2008;337

5. Kaminski M, Skonieczna-Zydecka K, Loniewski I, Koulaouzidis A, Marlicz W. Are probiotics useful in the treatment of chronic idiopathic constipation in adults? A review of existing systematic reviews, meta-analyses, and recommendations. Prz Gastroenterol. 2020;15(2):103-18

6. Goetze O, Fruehauf H, Pohl D, Giarrè M, Rochat F, Ornstein K, et al. Effect of a prebiotic mixture on intestinal comfort and general wellbeing in health. Br J Nutr. 2008;100(5):1077-85

7. Wen Y, Li J, Long Q, Yue CC, He B, Tang XG. The efficacy and safety of probiotics for patients with constipation-predominant irritable bowel syndrome: a systematic review and meta-analysis based on seventeen randomized controlled trials. Int J Surg. 2020;79:111-9. doi:10.1016/j.ijsu.2020.04.063

8. Sánchez-Rodríguez JR, Escare-Oviedo CA, Castro-Olivares VE, Robles-Molina CR, Vergara-Martínez MI, Jara-Castillo CT. Polifarmacia en adulto mayor, impacto en su calidad de vida. Revisión de literatura. Rev Salud Pública. 2019;21(2):271-7. https://doi.org/10.15446/rsap.V21n2.76678

9. Aragon G, Graham DB, Borum ML, Doman DB. Probiotic therapy for irritable bowel syndrome. Gastroenterol Hepatol (N Y). 2010;6(1):39-44

10. Silk DB, Davis A, Vulevic J, Tzortzis G, Gibson GR. Clinical trial: the effects of a trans-galactooligosaccharide prebiotic on faecal microbiota and symptoms in irritable bowel syndrome. Aliment Pharmacol Ther. 2009;29(5):508-18

11. Chang L. Current and emerging therapies in irritable bowel syndrome: from pathophysiology to treatment. Expert Rev Gastroenterol Hepatol. 2010;4(1):87-98

12. Quigley EM. Gut microbiota and the role of probiotics in therapy. Curr Opin Pharmacol. 2011;11(6):593-603

13. Sinn DH, Song JH, Kim HJ, Lee JH, Son HJ, Chang DK, et al. Therapeutic effect of Lactobacillus acidophilus-SDC 2012, 2013 in patients with irritable bowel syndrome. Dig Dis Sci. 2008;53(10):2714-8

14. Spiegel BM. Questioning the bacterial overgrowth hypothesis of irritable bowel syndrome: an epidemiologic and evolutionary perspective. Clin Gastroenterol Hepatol. 2011;9(6):461-9

15. Min YW, Park SU, Jang YS, Kim YH, Rhee PL, Ko SH, et al. Effect of composite yogurt enriched with acacia fiber and Bifidobacterium lactis on irritable bowel syndrome: a randomized controlled trial. World J Gastroenterol. 2012;18(33):4563-9.

FINANCING

None.

CONFLICT OF INTEREST

Authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: Josiany Maria Barboza, Karina Bustamente Galarza.
Data curation: Josiany Maria Barboza, Karina Bustamente Galarza.
Formal analysis: Josiany Maria Barboza, Karina Bustamente Galarza.
Drafting - original draft: Josiany Maria Barboza, Karina Bustamente Galarza.
Writing - proofreading and editing: Josiany Maria Barboza, Karina Bustamente Galarza.