



Probiotics and gastrointestinal diseases: A promising complementary medicine resource for treatment of gastrointestinal disorders and diseases

[Probióticos y enfermedades gastrointestinales: un prometedor nuevo recurso de la medicina complementaria para el tratamiento de trastornos y enfermedades gastrointestinales]

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Abstract

Context: Probiotics are living microorganisms (bacteria or yeasts) whose swallowing in an appropriate number has beneficial effects on host health and improves the host microflora. Different types of digestive diseases are treated by probiotics, including inflammatory gastrointestinal diseases, functional gastrointestinal disorders, irritable bowel syndrome and ulcerative colitis.

Aims: To analyze the role of the effect of probiotics on gastrointestinal disorders, especially intestinal illness.

Methods: Articles related to "probiotics and digestive disorders and diseases" were searched in citation databases including PubMed, Institute for Scientific Information, Scopus, Google Scholar and Magiran. The search strategy was based on the terms "probiotics and gastrointestinal disorders". Clinical trials and systematic reviews regarding the effects of probiotics on the prevention and treatment of gastrointestinal diseases were included. Irrelevant articles were deleted, and the rest of the articles were used to conduct review.

Results: *Lactobacillus rhamnosus GG*, *Bifidobacterium lactys*, *Streptococcus thermophilus*, *Saccharomyces boulardii*, *Escherichia coli* Nissle, Probiotic VSL#3, *Bacillus coagulans*, *Lactobacillus acidophilus* and *Streptococcus thermophilus* are one of the most important probiotics that affect gastrointestinal disorders.

Conclusions: According to the findings found in this review from clinical trials regarding the effects of probiotics on the prevention and treatment of gastrointestinal diseases, there is evidence that the probiotics have beneficial effects on the gastrointestinal disorders.

Keywords: diseases; disorders; gastrointestinal; probiotics; remedies.

Resumen

Contexto: Los probióticos son microorganismos vivos (bacterias o levaduras) cuya ingestión en un número apropiado tiene efectos beneficiosos sobre la salud del huésped y mejora la microflora del huésped. Los diferentes tipos de enfermedades digestivas se tratan con probióticos, que incluyen enfermedades gastrointestinales inflamatorias, trastornos gastrointestinales funcionales, síndrome de intestino irritable y colitis ulcerosa.

Objetivos: Analizar el papel del efecto de los probióticos en trastornos gastrointestinales, especialmente enfermedades intestinales.

Métodos: Se buscaron artículos relacionados con "probióticos y trastornos y enfermedades digestivas" en las bases de datos de citas, incluyendo PubMed, Instituto de Información Científica, Scopus, Google Académico y Magiran. La estrategia de búsqueda se basó en los términos "probióticos y trastornos gastrointestinales". Se incluyeron ensayos clínicos y revisiones sistemáticas sobre los efectos de los probióticos en la prevención y el tratamiento de enfermedades gastrointestinales. Se eliminaron los artículos irrelevantes y el resto de los artículos se utilizaron para realizar la revisión.

Resultados: *Lactobacillus rhamnosus GG*, *Bifidobacterium lactys*, *Streptococcus thermophilus*, *Saccharomyces boulardii*, *Escherichia coli* Nissle, Probiotic VSL # 3, *Bacillus coagulans*, *Lactobacillus acidophilus* y *Streptococcus thermophilus*, son los probióticos más importantes que afectan los trastornos gastrointestinales.

Conclusiones: De acuerdo con los hallazgos encontrados en esta revisión de ensayos clínicos sobre los efectos de los probióticos en la prevención y el tratamiento de enfermedades gastrointestinales, existe evidencia de que los probióticos tienen efectos beneficiosos en los trastornos gastrointestinales.

Palabras Clave: desórdenes; enfermedades; gastrointestinal; probióticos; remedios.

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INTRODUCTION

Gastrointestinal diseases are referred to all diseases affecting the gastrointestinal tract. It consists of diseases of the esophagus, stomach, intestines including duodenum, jejunum, ileum, ileocecal valve, and large intestine (including ascending, transverse and descending colon), sigmoid colon and rectum (Soenarto et al., 2009; Fischer Walker et al., 2012; GBD, 2015). The human intestinal flora contains a variety of bacteria, many of which are useful for optimal digestion of food. Some of these bacteria known as probiotic bacteria, in addition to being helpful for digestion, produce complex molecules and compounds like vitamins and antibiotics that are beneficial to the body. The source of probiotic bacteria is dairy and fruit (Rachmilewitz et al., 2004). According to the WHO and US Food and Drug Administration, probiotics include living microorganisms that, if used adequately, may be beneficial in terms of maintaining the health of their host. These microorganisms, through various mechanisms, create inappropriate conditions for the growth of harmful microorganisms, playing a significant role in the prevention of gastrointestinal infections (Nobaek et al., 2000). In another definition, the Food and Agriculture Organization and the World Health Organization (WHO), the probiotics are living microorganisms (bacteria or yeasts) that, by swallowing them in an appropriate number, have beneficial effects on host health and improve the natural host microflora (Niedzielin et al., 2001). The main criteria for selecting probiotic strains include human origin, resistance to acid and bile of the digestive system, and the ability to stick to the intestinal wall and to combat the pathogenic microbes of the environment (Schrezenmeir and de Vrese, 2001). One of the effective ways of preventing or treating these diseases is the consumption of probiotic products, so that over 90% of the probiotic product containing *Lactobacillus acidophilus* and *Bifidobacterium bifidum* is produced worldwide (Saggiaro, 2004). The effect of probiotics on the microbial flora of the digestive system and its therapeutic role depend on the amount of daily intake of them (Saggiaro, 2004). The maximum range for living probiotic bacteria is 10^6 - 10^8

CFU/mL (Bausserman and Michail, 2005). The number of probiotic bacteria remaining in the food must be at least 10^6 - 10^8 per L g or mL, so that they can be useful in maintaining health (Macpherson and Uhr, 2004). Today, international standards consider the existence of a minimum of 10^7 CFU/mL of probiotic bacteria in health products while consuming the product (Isolauri et al., 2001; Niedzielin et al., 2001; Sen et al., 2002). Probiotics are increasingly being marketed as food supplements in the form of pills, capsules, dough and dried frozen treatments. Different types of digestive diseases are treated by probiotics, which can be attacked by inflammatory diseases of the gastrointestinal tract, functional digestive system diseases, IBS, and ulcerative colitis, among others. (Yoon and Sun, 2011; Elazab et al., 2013; Indrio et al., 2014) the effects of probiotics on gastrointestinal, especially intestinal, disorders were studied.

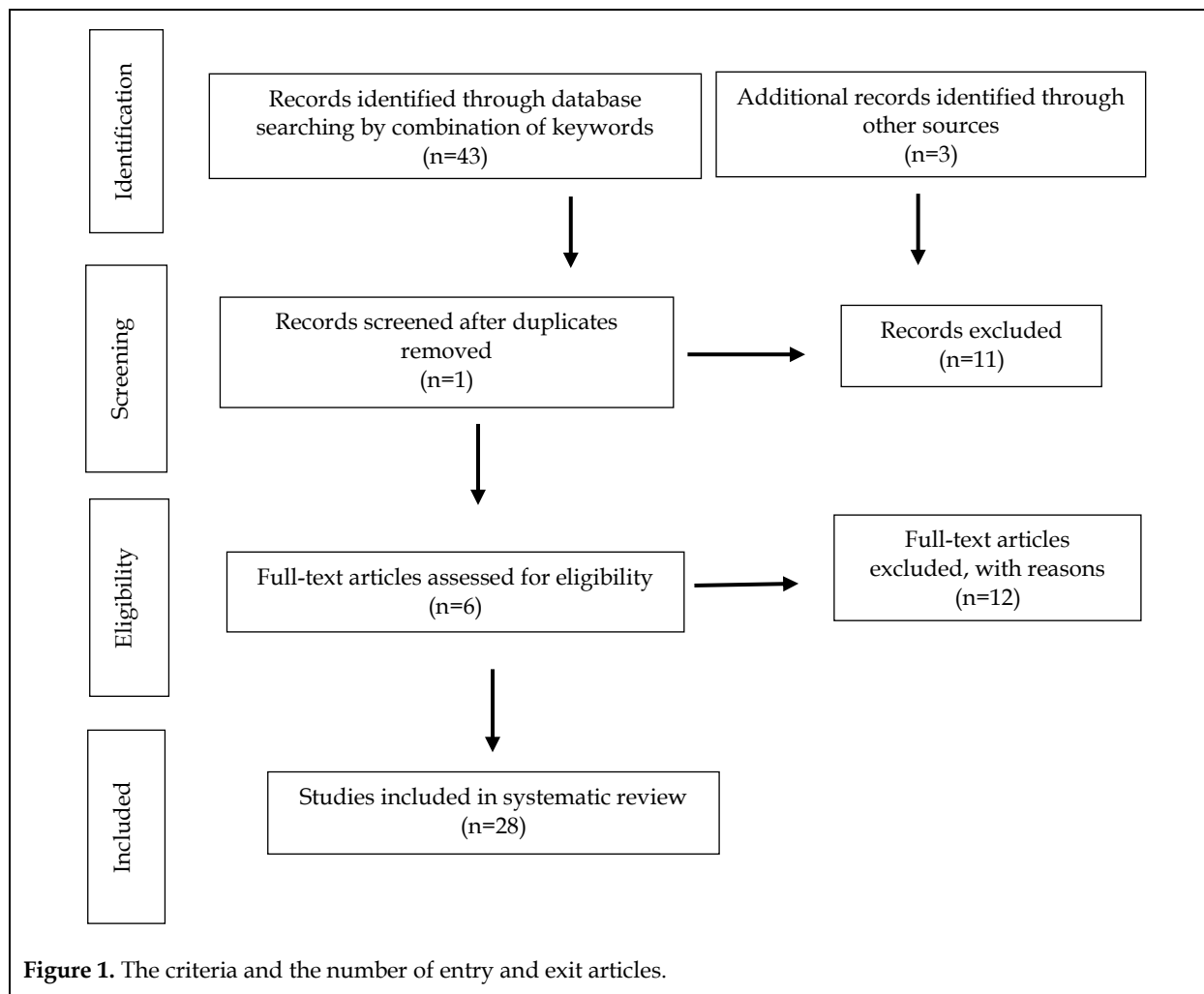
METHODOLOGY

Study design

After searching the literature for this study, the authors filtered all the studies in order to choose several articles that met the pre-identified selection criteria. When eligibility testing had been completed, the data analysis was performed in two stages, select and delete appreciation. The variables in this study were "probiotics", "gastrointestinal disorders" and "clinical studies".

Literature search

In this review article, the effects of probiotics on gastrointestinal, especially intestinal disorders were studied. Articles related to probiotics and digestive disorders and diseases were searched in citation databases including PubMed, Institute for Scientific Information, Scopus, Google Scholar and Magiran and clinical trials and systematic reviews regarding the effects of probiotics on the prevention and treatment of gastrointestinal diseases were included. Irrelevant articles were deleted, and the rest of the articles were used to conduct review (Fig. 1).



Selection criteria

The criteria for entering articles into the study included a probiotic clinical study on gastrointestinal disturbances and the criteria for exiting the articles was not complete and repetitive and poster articles and conferences.

Data assessment

Out of 46 articles, 1 article was deleted, and 45 articles were retained. Eleven articles were dropped due to inadequate data and lower-level journals. Out of the 34 remaining papers due to the lack of full text of the articles, 6 the full text articles were excluded for eligibility, and finally 28 articles were examined (Fig. 1).

RESULTS AND DISCUSSION

In the current review, probiotics with species such as *Lactobacillus rhamnosus* GG, *Bifidobacterium lactys*, *Streptococcus thermophilus*, *Saccharomyces boulardii*, *Escherichia coli* Nissle, Probiotic VSL#3, *Bacillus coagulans*, *Lactobacillus acidophilus* and *Streptococcus thermophilus* are one of the most important probiotics that affect gastrointestinal disorders are the most common probiotics effective on common gastrointestinal disorders such as ulcerative colitis, irritable bowel syndrome, acute diarrhea, infectious diarrhea, antibiotic-associated diarrhea, and lactose intolerance.

Table 1 summarizes findings on the effects of probiotics on common gastrointestinal disorders.

Table 1. Use of probiotics on common gastrointestinal disorders.

Probiotics (Species)	Disease/Disorder	Reference
Probiotic	Effective on acute diarrhea of infants and adults	(Allen et al., 2004)
Probiotic	Reduces time to get diarrhea by 17 to 30 hours	(Szajewska and Mrukowicz, 2001; Van Niel et al., 2002)
Probiotic	Since the beginning of the diarrhea begins, duration of diarrhea a day reduced	(Huang et al., 2002)
<i>Lactobacillus</i>	Strengthen immune responses that regulate secretion and movement, and the production of substances by lactobacilli that deactivates viruses	(Harish and Varghese, 2006; Homayouni, 2008)
<i>Lactobacillus rhamnosus</i> GG (LGG)	Reduce the frequency of diarrhea per day and the duration of diarrhea in children as compared to control group	(Canani et al., 2007)
Probiotic	Reduced diarrhea caused by taking antibiotics is more effective than placebo	(Cremonini et al., 2002; D'Souza et al., 2002)
<i>Lactobacillus rhamnosus</i> GG (LGG)	Reduces the risk of developing diarrhea caused by antibiotics	(Hawrelak et al., 2005)
<i>Bifidobacterium lactys</i> and <i>Streptococcus thermophilus</i>	Effective on diarrhea caused by antibiotics in infants	(Correa et al., 2005)
<i>Saccharomyces boulardii</i>	An effective medication for treating diarrhea caused by antibiotics	(Homayouni, 2008)
<i>Saccharomyces boulardii</i>	It stops the growth of <i>Clostridium difficile</i>	(Surawicz, 2003)
Probiotic	Probiotics may be effective in preventing and treating diarrhea caused by <i>Clostridium difficile</i>	(Dendukuri et al., 2005)
Probiotic	Effective on radiation induced diarrhea	(Fuccio et al., 2009)
<i>Saccharomyces boulardii</i>	Effective on travel diarrhea, especially bacterial diarrhea	(Kollaritsch, 1993)
Probiotic	Effective on chronic gastrointestinal diseases, especially inflammatory bowel disease	(Vanderpool et al., 2008)
Probiotic	Effective on the treatment of acute ulcerative colitis	(Zigra et al., 2007)
<i>Escherichia coli</i> Nissle	Effective on the treatment of ulcerative colitis	(Rembacken et al., 1999)
<i>Bifidobacterium</i> probiotic	Effective on the treatment of ulcerative colitis	(Kato et al., 2004)
Probiotic VSL#3	Effective on the treatment of ulcerative colitis	(Bibiloni et al., 2005)
<i>Lactobacillus rhamnosus</i> GG (LGG)	Ulcerative colitis and prevention of recurrence of the disease	(Zocco et al., 2006)
<i>Bacillus coagulans</i> , <i>Lactobacillus acidophilus</i> , <i>Bifidobacterium lactys</i> and <i>Bifidobacterium bifidum</i>	Improve the clinical symptoms of irritable bowel syndrome	(Hun, 2009)
Probiotic	Improve the clinical symptoms of irritable bowel syndrome	(Williams et al., 2009)
Probiotic	Improve the clinical symptoms of irritable bowel syndrome	(Sanders, 1993)
Probiotic	Effective on the treatment of lactose intolerance by digestive enhancement	(Saltzman et al., 1999)
<i>Lactobacillus bulgaricus</i> and <i>Streptococcus thermophilus</i>	It is effective in improving the symptoms of lactose intolerance	(Levri et al., 2005; Shermak et al., 1995)

Probiotics and its various types and species are ours, and some other nutritional supplements are used for treatment. In general, the use of probiotics

is a good way to prevent and treat antibiotic-associated diarrhea. But the question of which probiotic bacteria and with what dose has the

greatest impact has not yet been determined. Studies have reported reliable evidence regarding the effects of probiotics on the treatment of common gastrointestinal disorders including infectious diarrhea, antibiotic-associated diarrhea, and lactose intolerance. According to the results in this study, probiotics were found to be effective in treating gastrointestinal disorders (Saltzman et al., 1999; Szajewska and Mrukowicz, 2001; Huang et al., 2002; Van Niel et al., 2002; Allen et al., 2004; Hawrelak et al., 2005; Levri, 2005; Harish and Varghese, 2006; Canani et al., 2007; Homayouni Rad, 2008; Vanderpool et al., 2008; Fuccio et al., 2009; Hun, 2009; Williams et al., 2009). Probiotics in the gut by inhibiting the growth of the microbial flora of the intestine, preventing the growth of pathogens, producing antimicrobial agents, stimulating the immune system, stabilizing salt and bile acids inhibit growth and eventually reduce the number of pathogens in the gastrointestinal tract (Roberfroid et al., 2000). Probiotics therefore treat gastrointestinal disorders with similar mechanisms.

Future perspectives

Due to the high prevalence of digestive disorders, it seems that the therapeutic effects of probiotics in common gastrointestinal disorders such as ulcerative colitis, irritable bowel syndrome, acute diarrhea, infectious diarrhea, antibiotic-associated diarrhea, and lactose intolerance has been reported effective drugs for gastrointestinal disorders and solve this problem.

CONCLUSIONS

Probiotics can be used as a safe and new source of complementary medicine and aids in gastrointestinal disorders and diseases, but more clinical studies are needed to clarify their effectiveness and effectiveness in the prevention and treatment of gastrointestinal diseases done.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHOR CONTRIBUTION:

Contribution	Anbari K	Firouzi M	Abbaszadeh S
Concepts or ideas	x		x
Design		x	x
Definition of intellectual content	x		x
Literature search		x	x
Experimental studies	x	x	x
Data acquisition	x	x	x
Data analysis	x		x
Statistical analysis		x	
Manuscript preparation	x	x	x
Manuscript editing	x	x	x
Manuscript review	x	x	x

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