Review Article

Probiotics in Children

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ABSTRACT

Probiotics are safe for healthy children and may help with diarrhea, constipation, and colic issues. Huge papers about probiotics are produced daily, making clinical up-date on their effectiveness extremely difficult. Therefore, this paper aims to summarize the potential benefit of using probiotics in children.

Keywords: diarrhea, probiotics

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Introduction

The intestine is a highly complex system that protects the host through strong defense mechanisms from the external environment. Trillions of living bacteria exist in the human intestine. We have more bacteria in our bodies (10 times greater) than the total number of our somatic and germ cells. We carry about 2 kg of bacteria. Over 500 species of bacteria are present in the human colon.[1] The gastrointestinal tract of a normal fetus is sterile. During the birth process: the aseptic or sterile digestive tract of the fetus is inoculated with bacteria (proximity of the birth canal and the anus). Rapidly thereafter, effective methods of ensuring the transmission of microbes to the sterile GIT through the following methods.: 1) Parental expression of neonatal care: suckling, kissing and caressing (mother's flora) 2) Genetic factor 3) Surrounding environment 4) Feeding pattern: the first most significant challenge is one the intestine becomes inhabited by microbes characterised by instability and fragility. Later, the microbiota will stabilize according to the type of feeding.

Probiotics

The most widely used definition of probiotics was given by the Food and Agriculture Organization of the United Nations and the World Health Organization in 2002. That definition was accepted with a minimal change by an expert panel (International Scientific Association for Probiotics and Prebiotics) in 2014, stating that [2] Probiotics are adequate "live microorganisms amounts, confer a health that, benefit when on the administered host." In humans, bacteria from, by far, the genus most commonly Lactobacillus or used. Probiotics Bifidobacterium are yeast and Saccharomyces boulardii. The most familiar sources of probiotics are yogurt, fermented foods, and supplements.[3]

Probiotics- Criteria

1) Application in the living state
2) Resistance to gastric acid and bile
3) Ability to adhere to colonocytes
4) Ability to colonize the gut
5) Clinically proved favorable health effect
6) Safety.

Mechanisms of Probiotic Action

1) Pathogen Inhibition: Competes with harmful bacteria for nutrients and binding sites in the gut.
2) Strengthening Gut Barrier: Enhances intestinal lining integrity to prevent infections.
3) Immune Modulation: Stimulates immune response and balances pro- and anti-inflammatory responses. Examples (e.g., Lactobacillus rhamnosus for gut health, Bifidobacterium lactis for immunity).[4]

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Frequent

◦ Enzyme activity ◦ Vitamin synthesis. bioactives ◦ Direct antagonism effect ◦ Gut barrier reinforcement ◦ Bile salt metabolism ◦ Neutralisation of carcinogens.[5]

Rare : [6]

Immunological effects

Production of a specific enzyme

Endocrinological effect

Widespread

- ◦ Colonisation resistance
- ◦ Acid and short-chain fatty acid production
- ◦ Regulation of intestinal transit
- ◦ Normalisation of perturbed microbiota
- ◦ Increased turnover of enterocytes
- ◦ Competitive exclusion of pathogen
- Neurological effect

Probiotics – effects[7,8]

1) Involvement in the production of essential nutrients of the colonic mucosa.
2) Beneficial effect on intestinal immunity
3) Recovery of the disturbed gut mucosal barrier " and prevention of microbial translocation
4) Elimination of toxins and eradication of microbial pathogens Cont.
5) Competitive inhibitor of bacterial adhesion
6) Synthesis of compounds that inhibit or destroy pathogens
7) Competitive consumption of nutrients required for the growth of pathogens.

Beneficial effects of probiotics in human [9,10]

- Diarrhea:- Probiotics have preventive and curative effects on diarrhea
- Irritable Bowel Syndrome (IBS):- The Lactobacillus plantarum 299V can prevent it.
- Helicobacteriosis: The probiotic had an in vitro inhibitory effect on reducing gastric inflammation.
- Necrotizing Enterocolitis: - Treating with B. Infantis and L. Acidophilus in newborns reduces NEC.
- Urogenital infection: It can be prevented by taking L.fermentum and L.rhamnosus.
- Colon cancer: -Lactic bacteria may act against colon cancer.
- Blood pressure: Milk fermented by lactic acid bacteria may reduce this sickness. How Probiotics Work
- Gut Microbiota Balance: - Probiotics help maintain a healthy balance of gut bacteria.
- Strengthening Immune System: They promote immune function and may protect against infections.
- Enhancing Digestive Health: Probiotics improve digestion and may alleviate diarrhea and constipation. These are the benefits of probiotics in children.
- Diarrhea:- Reduces duration and severity, particularly antibiotic-associated diarrhea.
- Irritable Bowel Syndrome (IBS): Some strains can help relieve symptoms.
- Eczema and Allergies:- Early probiotic use may reduce the risk of eczema and some allergies.
- Respiratory Infections: -Can lower the risk of common colds and other respiratory infections.
- Colic: - Certain probiotics may reduce crying time in colicky infants. Probiotics and Immune Function in Children
- Modulation of Immune Cells: - Effects on T-cells, B-cells, and cytokine production.
- Prevention of Allergies: - Early use of probiotics in infancy and its potential to prevent allergic diseases.

Probiotics – Adverse Effects[9,10,11]

◦ Abdominal Cramping

◦ Nausea

◦ Fever

◦ Soft Stools

◦ Flatulence

◦ Taste difference

◦ Disseminated fungemia with Saccharomyces boulardii (treated with anti-fungal Probiotic Strains and Their Targeted uses

◦ Common Strains and Conditions:

◦ Lactobacillus rhamnosus GG: Gastroenteritis, antibiotic-associated diarrhea. ◦ Saccharomyces boulardii: Clostridium difficile infections, diarrhea. ◦ Bifidobacterium lactis: Immune support. ◦ Importance of Strain-Specificity: Benefits are often strain-specific, so choosing the right strain is critical for desired outcomes.

Clinical Guidelines for Paediatric Probiotics[10,11]

When to Recommend Probiotics

- Acute diarrhea and gastroenteritis.
- Antibiotic-associated diarrhea.
- Preventative measures in high-risk allergy children.

Pediatric Dosage Recommendations: Vary by age and specific strains.

Duration of Use: Short-term use is for acute conditions; long-term use requires professional guidance.

Controversies and Limitations in Probiotic Use

Mixed Results in Research: Not all studies show consistent benefits, particularly for allergies and respiratory infections.[12] Lack of Regulation in Supplements: Probiotic supplements are not always FDA-regulated; quality can vary. Not answered Questions: Gaps in research about long-term safety and effectiveness in children.[13]

Conclusion

Probiotics are helpful in certain gastrointestinal and immune-related conditions. We can only recommend strains with clinical support for specific conditions. Teach parents about the correct usage, potential benefits, and limitations of probiotics is essential. The abovementioned evidence further demonstrates that not all probiotics have the same efficacy for every specific clinical indication. The field of probiotics has increased tremendously. So, it is hard for clinicians to follow the literature. Therefore, recognizing scientific authorities and following their guidelines is of utmost importance.

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