

Prebiotics for Children health in Bangladesh

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Prebiotics are non-digestible components of food that trigger the expansion of beneficial microbes (bacteria, fungi) in the gut with valuable effects for the health of the host.¹ In 1995, Glenn Gibson and Marcel Roberfruid first introduced the concept about Prebiotics and was described as " a non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon, and thus improves host health".² In 2007, FAO/WHO experts described prebiotics as a nonviable food component that confers a health benefit on the host associated with modulation of the microbiota.³

Prebiotics may be used as substitute to probiotics or as an additional support for them. Nevertheless, different prebiotics will stimulate the growth of different indigenous gut bacteria. Prebiotics have tremendous potential for modifying the gut microbiota and these modifications occur at the level of individual strains and species.³

Nowadays the evolution of probiotic and prebiotic research because of their health benefits, supported by different clinical studies. Further clinical study showed prebiotics can improve general health, and in some cases provide adjunctive anti-disease benefits. Different studies showing that the body's microbiota can be modulated, by use of probiotics and prebiotics, that has led to the development of target immunity, regularity, allergy, gut and distant site infection, cardiovascular disease, prevention of cancer and other ailments.⁴

About 70% of the immune system is localized in the gastrointestinal tract: its glands, mucosa, and mucosa-associated lymphoid system. The intestine may contain 10 times more microbes than there are eukaryotic cells in the entire body. These

microbes function depends on the supply of food destined for the colonic bacteria. Food items especially such as fermentable fibers, complex proteins, gastrointestinal secretions increase the activity of probiotics. Unfortunately, the activity of these clinically essential probiotics may reduce due to the conditions such as supply of drugs especially antibiotics, and reduced supply of food especially fruits and vegetables.⁵ To improve friendly probiotics, a supply of new and effective flora (probiotics) and food for the flora (prebiotics) is needed, from which numerous health-supporting products will be produced and absorbed at the level of the mucosa.⁵ A healthy intestinal microbiota is essential to human health, performing a wide range of protective, structural, and metabolic functions and affecting host nutrition both directly and indirectly. Gut bacteria also produce vitamins (B3, B5, B6, B12, biotin, tetrahydrofolate, and vitamin K) and promote the absorption of minerals.⁶

In Bangladesh, childrens are suffering from different kinds of diseases because they are in lacking of important nutrients and vitamins. If they were provided the desire food ingredients, that will help to increase microbiota in their guts and create a good environment for gut microflora. These microflorae not only help to produce essential vitamins but also regulate different essential pathways of metabolism. Another point of view in urban area, Children are suffering from obesity problem due to uncontrolled feeding. As a therapeutic prebiotic can be applied to encourage gut microflora. These diet-microbial-host interactions may alter the growth and metabolism of child malnutrition as well as

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obesity and its metabolic comorbidities, including nonalcoholic fatty liver disease with obesity and cardiovascular disease.⁷ It is already proved probiotics and prebiotics have a major influence on gastrointestinal flora composition and this change in flora composition is beneficial for children health. Another study found prebiotics and probiotics can be act as prevention and treatment of acute gastroenteritis, antibiotic associated diarrhea (AAD), traveler's diarrhea, inflammatory bowel disease, irritable bowel syndrome, *Helicobacter pylori*, necrotizing enterocolitis, constipation, allergy and atopic dermatitis, colic and extra-intestinal infections. The beneficial effects of probiotics in acute infectious diarrhea in children seem to be like as: (i) moderate; (ii) dose dependent; (iii) strain-dependent; (iv) significant in watery diarrhea and viral gastroenteritis, but non-existent in invasive, bacterial diarrhea; and (v) more evident when treatment with probiotics is initiated early in the course of disease and these results encourage us to take prebiotic & probiotic supplementation to treat children diarrheal disease.^{8,9}

In Bangladesh, children are often suffering from diarrheal disease and the mortality rate is quit high due to diarrhea in children. So prebiotics can be act as a magic bullet for not only augmentation of children immune system but also directly reduce the rate of diarrhea by creating a proper intestine environment. The best evidence has been accumulated for some lactobacilli strains and for *Saccharomyces boulardii* in the reduction of the duration of acute diarrhea due to gastroenteritis and prevention of AAD and these essential bacterial populations can be increased by providing adequate diet, we described them as prebiotics.⁷ Not only children, the adults may suffering from intestinal problem such as inflammatory bowel disease, irritable bowel syndrome may treat with prebiotics. Study says prebiotics in combination with Zinc limits diarrhea duration in children.^{10,11} Bangladesh, as a middle class economic condition in place of clinical treatment of

diarrhea prebiotics can be a useful supportive to cope up with children diarrhea. Not only this, when prebiotics increase the population of *Lactobacillus plantarum* 299v in intestine they could improve nutrient status and promote growth in children as well as modulating immune response.¹²

Colorectal cancer (CRC) remains one of the most common and deadly cancers over the world. In case of CRC intestinal gut microflora is important to maintain and contributes to several intestinal functions, including the absorption of complex macromolecules, development of the mucosal immune system, synthesis of amino acids/vitamins and the protection against pathogenic microorganisms. It is well known that the gut microbiota changes may have an essential impact in the initiation and promotion of chronic inflammatory pathways and also have a profound different genetic and epigenetic alterations leading to dysplasia, clonal expansion, and malignant transformation. Probiotic bacteria has antitumor activity with various mechanisms such as nonspecific physiological and immunological mechanisms.¹¹

In conclusion, to date, the most extensively studied and best documented clinical application of prebiotics and probiotics are for the treatment of acute diarrheain children. They are also useful in modulating growth and immune response in children. So Prebiotics for Children health may act as a crucial role to children health and nutritional status in Bangladesh.

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