ECRONICON OPEN ACCESS

EC GASTROENTEROLOGY AND DIGESTIVE SYSTEM

Editorial

Alleviating Malnutrition through Cultivation and Domestication of Healthy Gut Microbiota

Rajesh N Gacche*

Professor, Department of Biotechnology, Savitribai Phule Pune University, Pune, Maharashtra, India

***Corresponding Author:** Rajesh N Gacche, Professor, Department of Biotechnology, Savitribai Phule Pune University, Pune, Maharashtra, India.

Received: August 08, 2018; **Published:** August 10, 2018

Severe acute malnutrition is the world-leading cause of children mortality, its severity and incidence is more in majority of the developing countries most notably in sub-Saharan Africa, Central America and South Asia etc. The malnutrition driven mortality for children under 5 years of age accounts up to 1 - 6 million deaths every year [1]. Besides the remarkable progress made in the production of food grains, still we could not develop a concrete programme for tackling the global issue of malnutrition in many parts of the world. One of the reasons might be lack of information about the concrete players in causation of malnutrition. Perhaps, besides the involvement of inadequate nutrient intake along with additional environmental insults, there are few more players suspected to be instrumental in causation and progression of malnutrition. Our conventional thinking of correlating a poor diet as a major culprit of severe malnutrition is questioned on the eve of evolving findings that articulates the conspiracy of undomesticated bad microbiota in intestine in concert with nutrient poor diet promote and perpetuate malnutrition [2].

Sizable amount of research has accumulated in the recent past that describes the role of digestive tract beneficial bacteria in our overall health, carrying signals to our different organs, influencing our brain chemistry, and role in digestion of food that we eat. Of note, even though we are eating the most nutrient-rich diets consistently, but if we don't have sufficient density of gut microbes needed to synthesize and absorb those nutrients from our food stuff, perhaps we might be victim of malnutrition. This clearly indicates that our gut microbes really make a difference in making us excited or depressed [3]. In the current state of the art, series of preclinical and clinical reports describes the link between gut microbiota and malnutrition. For example, it has been observed that microbiota assembly is found to be altered in children with undernutrition, resulting in persistent microbiota immaturity which is not rescued by currently used nutritional and dietary interventions. Undoubtedly, Food is a major contributing factor that harbours the diversity and proportional representation of microorganisms in the gut microbiota. Reversely, the diversity of the gut microbiota/microbiome equally influences the nutritional value of food. Nevertheless, our habits of getting addicted with fast food coupled with change in life style might attenuate the colonization of good microbes which are involved in digestion and absorption of food ingredients. Therefore the famous proverb of "eat high quality and nutritious foods and be healthy" will be an illusion if your gut microbiota is seriously insulted. Most of the human population across the world has concern towards the quantity of the of food that we eat, but unfortunately majority of us still do not think about what we eat and more precisely what is the bioavailability of nutrients that are effectively absorbed from the food that we eat.

Preclinical model studies have widened our understanding towards the effect of different dietary ingredients on microbiota structure, functions, and host biology. Overall, the evolving research has set a proof-of-concept about the gut microbiome regulated pathophysiological mechanisms of malnutrition [4]. To quote some of the representative example as case studies, in an interesting preclinical experimental settings, a panel of researchers isolated gut microbes from both healthy and malnourished Malawian children and injected them into young mice which were also fed with typical Malawi diet. Surprisingly, it was observed that the microbes from the malnourished group were unable to absorb nutrients, moreover the mice injected with these microbes showed reduced growth. On the contrary, the mice that were given the bacteria from the stronger microbiomes, absorbed more nutrition from food and grew denser bones and more

muscle [2]. Here, the take to home message of the study is that the profile of the gut microbes drives the physiological effects and not the access to kinds of food being eaten. In another interesting study design, researchers measured the development pattern of two groups of mice which were treated with and without gut bacteria. Here too, the observations were interesting wherein, the bacteria-free mice demonstrated stunted growth patterns, and on the other hand the mice with a healthy balance of gut bacteria had bigger bones and were healthier owing to the health promoting roles played by gut microbacteria [5]. These findings stretched the eye brows of the nutrition and health research communities across the world and highlighted these findings as "profound findings in human nutrition". To a greater extent these findings have established a proof-of-concept that malnutrition isn't necessarily about hunger, but it's also about inscrutable health promoting effects of gut microbiota. In a cohort study of children living in an urban slum of Dhaka, Bangladesh, the study results revealed that persistent gut microbiota immaturity was strongly attributed with the malnourished Bangladeshi children. The study also demonstrated that microbiota associated severe acute malnutrition can be only partially ameliorated by nutritional interventions [6]. Therefore optimizing the cultivation and domestication of gut bacteria may ward against malnutrition

The excitement of developing health promoting probiotics has gained momentum owing to the role of gut microbiota in the amelioration of malnutrition [7]. According to definition of the Food and Agriculture Organization of the USA and the WHO, probiotics is a live micro-organisms which, when administered in adequate amounts, confer a health benefit on the host [8]. In many parts of the world, probiotics have been ingested for centuries, as part of fermented food products. The recent research findings supports that the benefits of dietary intake of probiotics also contribute towards weight and length/height gain, especially in children who are under-nourished and also in healthy children living in developing countries. The prescriptions of probiotics in the management malnutrition and diarrhoea in children is not a new therapeutic modality [9], however the current research findings added the value towards the usage of probiotics as therapeutic intervention for the amelioration of malnutrition. Besides some notable specific probiotic strains such as *Lactobacillus rhamnosus, Lactobacillus acidophilus, Bifidobacterium lactis HN019; Bifidobacterium longum, Thermophilus streptococci, Bulgaria lactobacilli, Bifidum bacteria;* and *Enterococcus faecium* IS-27526 [10]; there are number of recently identified potent probiotic bacterial strains which includes *Alistipes indistinctus, Anaerostipes caccae, Bacillus licheniformis, Bacteroides salyersiae, Bifidobacterium adolescentis, Intestinimonas butyriciproducens, Lactobacillus parabuchneri, Lactobacillus perolens, Lactobacillus vaccinostercus, Terrisporobacter glycolicus, Weissella confusa* etc. which perhaps can be employed for the management of severe acute malnutrition [7]. Different types of probiotic strains have distinct effects and even the closely related strains may demonstrate different clinical effects [11]. Therefore the Food and Agricultural Organization of the USA emphasizes that the effects of a specific probiotic strain should not be assumed to occur in other strains [12], and hence more research is needed on the specific probiotic strains so as to prescribe it as a personalized therapeutic modality for the management of malnutrition.

In summary, the current research findings have sensitized the notion that restoration of the gut microbiota of malnourished patients might prove to be a therapeutic approach for better health outcome. The researchers have also succeeded to a greater extent in establishing the importance of gut microbiota as counteracting agency towards the negative effects of malnutrition and also raised the significant hopes of developing gut microbiota as a therapeutic intervention for effective management of malnutrition. Equally, we need to spike therapeutic functional foods which might harbour health promoting microbiomes in malnourished kids.

Bibliography

1. WHO: Levels and trends in child mortality. WHO (2015).

2. Smith MI., *et al*. "Gut microbiomes of Malawian twin pairs discordant for kwashiorkor". Science 339.6119 (2013): 548-554.

3. Rajesh N Gacche. "Brain in Stomach: Lessons for Health Management". *EC Gastroenterology and Digestive System* 4.5 (2017): 135-136.

4. Subramanian S., *et al*. "Cultivating healthy growth and nutrition through the gut microbiota". *Cell* 161.1 (2015): 36-48.

5. Schwarzer M., *et al*. "Lactobacillus plantarum strain maintains growth of infant mice during chronic undernutrition". *Science* 351.6275 (2016): 854-857.

6. Subramanian S., *et al*. "Persistent gut microbiota immaturity in malnourished Bangladeshi children". *Nature* 510.7505 (2014): 417-421.

7. Tidjani Alou M., *et al*. "Gut bacteria missing in severe acute malnutrition, can we identify potential probiotics by culturomics?" *Frontiers in Microbiology* 8 (2017): 899.

8. Schlundt J. "Health and Nutritional Properties of Probiotics in Food Including Powder Milk with Live Lactic Acid Bacteria". Report of a Joint FAO/WHO Expert Consultation on Evaluation of Health and Nutritional Properties of Probiotics in Food Including Powder Milk with Live Lactic Acid Bacteria, FAO/WHO (2001).

9. Solis B., *et al*. "Probiotics as a help in children suffering from malnutrition and diarrhea". *European Journal of Clinical Nutrition* 56.3 (2002): S57-S59.

10. Onubi., *et al*. "Effects of probiotics on child growth: a systematic review". *Journal of Health, Population and Nutrition* 34 (2015): 8.

11. Allen SJ., *et al*. "Probiotics for treating acute infectious diarrhea". *Cochrane Database of Systematic Reviews* 11 (2010): CD003048.

12. Food and Agricultural Organisation-World Health Organisation. Evaluation of Health and Nutritional Properties of Probiotics in food including Powder Milk with Live Lactic Acid Bacteria. In: Joint FAO/WHO Expert Consultation (2001).

Volume 5 Issue 9 September 2018