International Journal of Educational Research and Development
www.journalofeducation.in
Online ISSN: 2664-7095, Print ISSN: 2664-7087
Received: 30-05-2021, Accepted: 16-06-2021, Published: 01-07-2021
Volume 3, Issue 3, 2021, Page No. 01-03

Evaluation of the enhancer effect of probiotic products on the immune system in the context of Covid-19 pandemic

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Abstract
Background: The aim of the study is to investigate and evaluate the potential benefits of use of probiotics to improve immune system in the context of covid-19 pandemic.
Materials and Methods: In the search for scientific literature related to this review the US National Library of Medicine (PubMed) used MEDLINE and Sport Discus data and the terms "SARS-CoV-2", "covid-19", "probiotics", and "immune system" were used. The relevant literature has also taken its source from the research of relevant articles from reference lists derived from data studies.
Results: Probiotics, which are beneficial microorganisms that help balance the in testinals, are arguably potential agents that are likely to benefit immune system. Nutritions that contain probiotic are quite common and accessible. With probiotic intake, it is possible to increase the immune response to viruses, including SARS-Cov-2 and manage the infection rates of the disease.
Conclusion: In order to manage the covid-19 pandemic, additional measures and precautions must be considered. Along with medications, vaccines and additional precautions such as social distancing, it is equally important to improve human immune system to cope with SARS-CoV-2 virus. It is a necessity for societies and countries all around the world to adapt their bodies in such way to be guarded against pathogens. Therefore, consuming probiotic containing products are strongly recommended to build a stronger immune response to harmful bacteria, viruses and pathogens.

Keywords: probiotics, SARS-CoV-2, covid-19, immune response

Introduction

Throughout centuries, mankind has developed certain defence mechanisms in order to remain alive against all threats to their bodies (Amos, 1981). Immune system is the main network that helps human body to be guarded against hazardous agents. The body has developed several barriers such as mucous, tears, saliva etc. (Stewart and Beswick, 1977) [18].
Even though human body developed such strong systems against pathogens such as bacteria, not all bacteria are harmful. Human digestive system includes bacteria that are in fact beneficial and necessary for digestion process to proceed. These bacteria help eliminate pathogens. When the amount of beneficial bacteria in the digestive system is below the ideal level, harmful bacteria are likely to cause unhealthy situations. Therefore, it is known that beneficial bacteria in the body are essential to remain a healthy environment in intestinal (Oyetayo *et al*., 2005) [15].
Covid-19 pandemic is still a global challenge for medical services all around the world. In spite of all efforts such as social distancing, testing, disinfecting, the prevalence of the disease is ongoing and further precautions are necessary. While medication therapies and vaccine shows promising results, it is equally important to take additional measures (Baud *et al*., 2020) [3].

Covid-19 Pandemic

A contagious disease outbreak was detected in Wuhan City of China in December 2019. The disease is caused by a coronavirus SARS-CoV-2. The outbreak first seemed to be local, however the virus spread all around the globe. In short time, World Health Organisation identified the outbreak as a pandemic (Li, Fan, *et al*., 2020; Jielun *et al*., 2021) [6, 13, 9].
The course of covid-19 disease varies depending on the person. While symptoms are barely visible in some patients, the disease causes serious complications such as organ failure and acute respiratory distress syndrome in other patients. There are various paths for SARS-CoV-2 to be transferred and primarily, it is a droplet-transmitted virus. In addition, guts are also known to be influential in the process of the patient being sick (Ng &Tilg, 2020) [14]. For instance, patients who suffer from Covid-19 demonstrated that the RNA of the virus can be found in their gastrointestinal tract (Pan *et al*., 2020; Jin *et al*., 2020; Lin *et al*., 2020) [16, 10, 13, 16].

Probiotics

Food and alcohol fermentation occurs with the assistance of certain microorganisms. Yet, this is not the only area where microorganisms can be beneficial. In the last few decades, it is understood that microorganisms may in fact help prohibit and fix health problems. The term that is used for these type of microorganisms is probiotics. The term dates back to early 1900s. Ever since, effects of probiotics on human metabolism has been an issue of interest. The earliest clinical trials on the issue date back to 1930s (Koop-Hoolihan, 2001) [12].

The definition of probiotics differed through history. Today, they can be defined as beneficial microorganisms which live in the body of the host (Hill *et al*., 2014) [7]. When these microorganisms survive in the body at an ideal level, they help maintain the internal balance and protect the body from harmful infections such as gastroenteritis, sepsis, and respiratory tract infections (RTIs). Clinical studies support the idea that probiotics are beneficial in the prevention and therapy of several health problems (Baud *et al*., 2020) [3].

Probiotics are commonly found in nutritional supplements and products people consume in their daily lives. Most common products that are known to include probiotics are milk, yoghurt etc. (Oyetayo *et al*., 2005) [15].

Potential of Probiotics to Manage Covid-19 Pandemic

Nearly 90% of upper respiratory tract infections are known to be caused by viruses. As a wide number of studies indicate, probiotics are quite beneficial prohibiting the upper respiratory tract infections (Baud *et al*., 2020) [3].

The gut microbiome has a significant influence on immune responses, including the lungs (Abt *et al*., 2012; Zelaya *et al*., 2016) [12, 19]. Studies argue that bifidobacteria or lactobacilli have a crucial effect on the clearance of influenza virus from the respiratory tract (Zelaya *et al*., 2016; Ichinohe *et al*., 2011) [19, 8]. According to the data supported by studies, probiotics alter the balance between proinflammatory and immunoregulatory cytokines that allow viral clearance. In addition, probiotics decrease the harm immune response causes to the lungs. Since acute respiratory distress syndrome is a common symptom of SARS-Cov-2, the mentioned benefits of probiotics on immune system can be considered as an important point in the fight against covid-19 (Baud at al., 2020) [3].

Discussion

It is not recent news that probiotics that are received orally from certain nutritions and supplements help improve immune system. In one study fermented product that consisted of L. acidophilus and bifido bacteria was given to human subjects. The researchers stated that total IgA levels showed a significant increase (Klaenhammer *et al*., 2012) [11].

In a review which is conducted in order to comprehend the potential benefits of probiotics, it was observed that probiotic intake significantly decreased the necrotizing enterocolitis, nosocomial sepsis, and mortality rates of the subjects (Dermyshi *et al*., 2017) [5]. Another similar study was conducted in India. The subject group was selected among newborn babies. The subjects were subjected to Lactobacillus plantarum among with prebiotics. The results demonstrated that newborns who received the treatment showed lower rates in sepsis and respiratory tract infections (Panigrahi *et al*., 2017) [17].

Another study was performed with 479 subjects. According to the trial, subjects who were in the control group which received Lactobacillus gasseri PA 16/8, Bifidobacterium longum SP 07/3, and Bifidobacterium bifidum MF 20/5 along with vitamins and minerals demonstrated promising results compared to the placebo-receiving group. The beneficial bacteria helped decrease the period of common cold. In addition, these subjects also experienced fewer days with high fever caused by the cold (de Vrese *et al*., 2005) [4].

Conclusion

In order to manage the covid-19 pandemic, additional measures and precautions must be considered. Along with medications, vaccines and additional precautions such as social distancing, it is equally important to improve human immune system to cope with SARS-CoV-2 virus. Probiotics, which are beneficial microorganisms that help balance the intestinals, are arguably potential agents that are likely to benefit immune system. Nutritions that contain probiotic are quite common and accessible. With probiotic intake, it is possible to increase the immune response to viruses, including SARS-Cov-2 and manage the infection rates of the disease. It is a necessity for societies and countries all around the world to adapt their bodies in such way to be guarded against pathogens. Therefore, consuming probiotic containing products are strongly recommended to build a stronger immune response to harmful bacteria, viruses and pathogens.

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