

BENEFICIAL MICROBES IN THE GUT AND AUTISM: THE ROLE OF PROBIOTICS

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Abstract: The Bristol stools forms scale (BSF scale) was used to compare the gastrointestinal health of autistic children before and after they took a probiotic for three months to the health of children who did not take a probiotic. Methods and Procedures of Research for the Study Case study participants' ages ranged from 9 to 16, and all had been given an autism diagnosis. The DSM-5 has diagnostic criteria for autism spectrum disorder. A research study in which both a pretest and posttest are administered to the same set of participants. For a full twelve months, study participants took a cocktail of three distinct multi-strain probiotics. The Bristol faecal form scale, sometimes known as the BSF scale, was used to record information at weeks 0 and 6. I found that the intensity of my stomach problems diminished after using probiotic medication.

Keywords: Probiotic; Microbiota; Autism; BSF scale

I. INTRODUCTION

Autism spectrum disease (ASD), a developmental condition of the neurological system, is distinguished by confined, repetitive actions as well as a lack of communication and social engagement with others [1]. ASD is an abbreviation for autism spectrum disorder. A significant number of autistic persons also have gastrointestinal symptoms such heartburn,

constipation, diarrhoea, abdominal discomfort, and vomiting [2]. This percentage of autistic people is expected to continue to rise. In their study of 137 autistic children, Molloy CA and Manning-Courtney P [3] discovered that 24 percent of the children had at least one gastrointestinal ailment. The study was conducted by Molloy CA and Manning-Courtney P. Diarrhoea was reported by one-seventh of the children, making it the most prevalent symptom that was experienced. In a study conducted by Nikolov RN and colleagues [4,] it was shown that 23 percent of 172 autistic children experienced signs of gastrointestinal issues, the most prevalent of which were diarrhoea and constipation.

According to a number of studies, symptoms of gastrointestinal diseases have been connected to autism, and the severity of autism has been found to correspond with the severity of these symptoms [4]. This relationship was made when researchers discovered a correlation between the two. Because researchers demonstrated a link between the two, this understanding is now generally accepted in the scientific community [5]. There is a possibility that they are connected to the bacteria that are found in the digestive systems of children and adolescents with autism. Alterations in the make-up of the microflora that live in the digestive tract, as well as their level of activity, have been connected to symptoms that are experienced by that tract [6]. the creation of conditions that are favourable to the growth of pathogenic germs on purpose in order to facilitate the spread of disease. youngsters diagnosed with autism spectrum disorder were found to have a more severe imbalance in their microbiome than youngsters who were growing ordinarily.

The bacteria that live in the digestive tract have an important role in a wide variety of fundamental physiological processes, including the regulation of gene expression, metabolism, the immune system, and the creation of neurotransmitters that are then transferred to the brain. In addition to this, it assists in the maturation of a person's brain as well as their neurological system. Inspiring the relationship between gut bacteria and the brain that scientists have uncovered (known as the "Gut-Brain axis"). A gut microbiota that is out of synch has been related to a number of health conditions, including food allergies, obesity, and even psychological disorders like autism. The intestinal microflora of many autistic children is altered, as evidenced by an increase in Sutterella and Firmicutes [7, 8], an increase in Bacteroidetes [4-9], and a decrease in Bifidobacteria [7, 8]. Clostridiales are a type of bacteria that are commonly located in the digestive tract.

Antibiotics, probiotics, and microbial transplantation have all been proven to reduce irritable bowel syndrome and recurrent clostridium difficile infections in children with autism [6,7]. This, in turn, alleviates some of the symptoms of autism that are linked with the condition.

Live microorganisms are what are known as probiotics, and they are available in supplement form. When used in appropriate amounts, it might be beneficial to one's health. Probiotics have the potential to either prevent or treat diseases that are related with metabolic function, immune response, the expression of genes, as well as the development of neurocognitive and behavioural capabilities. The composition of gut bacteria as well as their behaviour can be altered by probiotics, which can then set off an immune response. In addition to this, it can have a role in the generation of antioxidants and the breakdown of food into short chain fatty acids, both of which contribute to the preservation of healthy mucous membranes that line the digestive tract [9-11]. It's possible that normalising the gut microbiota, lowering inflammation, and restoring the mucosal barrier can be accomplished by the use of probiotics

in the treatment of autism. By monitoring changes in intestinal microbiota, gastrointestinal tract health, and autistic symptoms, the goal of this study is to evaluate whether or not probiotics are useful in lowering the symptoms of autism in Thai children. The findings of this study were primarily gathered in Thailand.

II. PROPOSED METHOD AND IMPLEMENTATION

The hypothesis regarding the effects of probiotics on gut beneficial microbes suggests that the consumption of probiotic supplements or foods containing live beneficial bacteria can have a positive impact on the composition and diversity of the gut microbiota. The gut microbiota refers to the complex community of microorganisms residing in the gastrointestinal tract, including bacteria, viruses, fungi, and other microorganisms. Probiotics are defined as live microorganisms that, when administered in adequate amounts, confer a health benefit to the host. They are often composed of strains of bacteria such as *Lactobacillus* and *Bifidobacterium*, although other species can also be used. The hypothesis suggests that these live bacteria, when ingested, can colonize the gut and interact with the existing microbial community. According to this hypothesis, probiotics can exert several beneficial effects on the gut microbiota:

Increased microbial diversity: Probiotics may enhance the overall diversity of the gut microbiota by introducing new bacterial species or strains. A diverse microbiota is generally associated with better gut health and overall well-being.

Restoration of microbial balance: Factors such as antibiotic use, stress, or poor diet can disrupt the balance of the gut microbiota, leading to an overgrowth of harmful bacteria. Probiotics may help restore this balance by promoting the growth of beneficial microbes and inhibiting the growth of pathogenic bacteria. **Production of beneficial compounds:** Probiotic bacteria can produce various metabolites and compounds that can have positive effects on the gut environment. For example, some strains are known to produce short-chain fatty acids (SCFAs), which provide energy to the gut cells and have anti-inflammatory properties. **Modulation of the immune system:** Probiotics have been suggested to interact with the host's immune system, potentially enhancing immune responses and promoting a healthy immune balance. This modulation may help regulate immune-related conditions in the gut.

While the hypothesis suggests these potential benefits, it's important to note that the effects of probiotics on the gut microbiota can vary depending on the individual, the specific strains used, and other factors. More research is needed to fully understand the mechanisms and overall impact of probiotics on gut beneficial microbes.

a. Research Framework

Researchers wanted to discover more about the impact that probiotics have on people with autism, so they enlisted the cooperation of eight autistic children who volunteered to take part in the study. The Bristol stool form scale (BSF scale) revealed that there was a reduction in the number of gastrointestinal symptoms experienced by children diagnosed with autism who took probiotics. The participants in the study took a probiotic supplement once a day for a period of six weeks while adhering to the study's instructions. The researchers collected data at the beginning and conclusion of the period and evaluated it based on the hypothesis that probiotics reduce gastrointestinal distress.

b. Control parameters

Consumption patterns are not something that should be based on the contents of a person's diet. It is recommended that you add inulin to your diet as a dietary supplement rather than eating cultured yoghurt because cultured yoghurt is high in probiotics but unhealthy for you. What exactly kind of things are these in their entirety? It is possible that it is present in some forms of diet coffee.

Pharmaceuticals and supplements to one's diet that come in tablet form Avoid using any kind of drug, including laxatives, antacids, and any other kind of drug.

It has always been the same thing, and there will never be any difference. Disqualification Conditions

Children with autism could also exhibit other symptoms, such as physical or emotional anguish.

Autism is distinguished by a range of symptoms, one of which is characterised by problems with the gastrointestinal system.

Epilepsy, food allergies, and irritable bowel syndrome (IBS) in autistic children; Anti-histamine medications (Anti-histamine) given to autistic children in study; autistic children who have taken medication for chronic diseases; autistic children who need to use antibiotics for more than 14 days in a row. Autistic children who have taken medication for epilepsy, food allergies, or IBS. Children diagnosed with autism who have been receiving treatment for a persistent ailment. Children diagnosed with autism who have been provided with.

c. Importance of research

Using probiotics as a complementary therapy for the gastrointestinal issues that often accompany autism. This is useful for both current and future studies of autistic patients.

d. Scope of Research

Find out more about how probiotics can help reduce the discomfort you're feeling in your stomach. Follow the directions provided by the researcher in order to take part in the daily experiments that involve the ingestion of probiotics for a period of sixty days. Next, conduct an analysis of the data beginning with week zero and continuing through week six.

e. Procedures

Case study participants' ages ranged from 9 to 16, and all had been given an autism diagnosis. The DSM-5 has diagnostic criteria for autism spectrum disorder. A research study in which both a pretest and posttest are administered to the same set of participants. For six weeks, study participants took a cocktail of three distinct multi-strain probiotics. There were 20 x 10⁹ colony forming units (CFU) of *Lactobacillus rhamnosus*, *Lactobacillus paracasei*, and *Bifidobacteria longum* in each of the probiotics. The Bristol faecal form scale, sometimes known as the BSF scale, was used to record information at weeks 0 and 6. Chi-square analysis was employed for the statistical analysis.

III. RESULTS AND DISCUSSION

The results of a probiotic supplement taken for six weeks are shown in Table 1. After taking probiotics for the suggested amount of time (six weeks), 11% of individuals returned to normal on the Bristol Stool Form Scale. Four of eight autistic children have shown significant improvement in their lives, as measured by the Bristol Stool Form Scale, whereas the lives of

two autistic children have shown minimal change. Furthermore, neither of the two children who were given probiotics showed any sign of improvement in their autistic symptoms.

Table 1: Increase in Percentage on the BSF Scale

Bristol Stool Form Scale							
No.	Before			After			Result
	Normal	Abnormal	%Normal	Normal	Abnormal	%Normal	
1	4	3	57%	4	3	57%	↔
2	1	8	11%	10	0	100%	↑
3	9	2	82%	8	1	89%	↑
4	6	8	43%	5	9	36%	↓
5	6	0	100%	7	0	100%	↔
6	14	0	100%	6	8	43%	↓
7	10	4	71%	15	0	100%	↑
8	7	6	54%	13	1	93%	↑
Total	57	31	65%	68	22	76%	↑

As can be seen in Table 1, taking probiotics is associated with a better score on the Bristol Stool Form Scale. This association is supported by the data. On the other hand, as can be shown in Table 1, the chi-square test yielded a p-value that was greater than 0.05 despite its name. According to these findings, the use of probiotic supplements is not associated with a substantial improvement in the symptoms of autism in children.

Chi-Square Test for Association: Period, Result

After	22	68	90
	26.80	63.20	
Before	31	57	88
	26.20	61.80	
All	53	125	178

Cell Contents
Count
Expected count

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	2.474	1	0.116
Likelihood Ratio	2.483	1	0.115

Fig 1: All autistic kids need to take a chi-squared test

Two autistic children had regular bowel motions before starting probiotics, as measured by the Bristol Stool Form Scale. Table 3 displays the findings after removing the eight autistic children with normal BSF scores.

Chi-Square Test for Association: Period_2, Result_2

	No	Ok	All
After	14 22.66	55 46.34	69
Before	31 22.34	37 45.66	68
All	45	92	137

Cell Contents
Count
Expected count

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	9.937	1	0.002
Likelihood Ratio	10.122	1	0.001

Fig 3: Before receiving probiotics, six autistic children all had abnormal BSF Scale scores.

The findings represent a substantial advancement in the study that has been done. The Bristol Stool Form Scale (p.05) was utilised to determine the outcomes of the examination.

IV. CONCLUSION

It is reasonable to draw the conclusion that probiotics may be able to assist ease the gastrointestinal problems associated with ASD. It is possible that parents of children diagnosed with ASD may be given the option of employing probiotics as an additional therapy option. This is due to the fact that probiotics do not require the use of any medications and are generally safe. The current study was carried out at a single location with a limited number of participants; a large number of further large-scale randomised controlled studies are required to conclusively demonstrate the efficacy of probiotics in the treatment of ASD.

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