

# *Lactobacillus Rhamnosus* GG (ATCC 53103) in the Management of Acute Diarrhea in Children

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**Abstract:** Probiotics have a role as adjuvant therapy in the management of childhood diarrhea along with oral zinc and oral rehydration salts (WHO). Increasing scientific evidence in the past decade has shown the role of probiotics in reducing the duration of diarrhea by a minimum of 24 hours. There are multiple probiotics that exist in the market as food supplements and some as pharmaceuticals, but strong scientific evidence and recommendations exist only for a few.

**Keywords:** Probiotics, LGG India, Acute Diarrhoea, Indian Children

## 1. Background

### Evidence

The WGO, ESPGHAN[1, 2] recommend the following probiotics in the management of diarrhea in children- *Saccharomyces boulardii* CNCM I-745 (Grade 1), *Lactobacillus rhamnosus* GG (LGG) (Grade 1), *Lactobacillus reuteri* DSM 17938 (Grade 2).

## 2. Materials and Methods

### Study design

India is a sub-continent with a plethora of gut microbiota- with lack of sufficient data in Indian Children on *Lactobacillus rhamnosus* GG. This was an observational study on a cross section of pediatric out-patients with diarrhea. We devised a standard proforma to collect data with multiple parameters for data collection. All children with diarrhea, between the age group of 6 months and 16 years were enrolled in our study.

Patients enrolled in the study were assessed, graded for dehydration and commenced on ORS, Zinc [3, 4] and LGG. The dose *Lactobacillus rhamnosus* GG (ATCC 53103) was 6 billion units, orally once daily for 5 days. The patients were followed up with appropriate advice and contacted via telephone to assess the child on Day 2 and Day 5 to assess the child and stool frequency (based on Bristol stool chart).

## 3. Results

50 children were enrolled and followed up. All patients were compliant with recommended therapy, there were 34% children in the 2-5 years age group, followed by under 2 years (34%) and above 5 years (32%), 56% of children were females (n=28). Nutritional assessment of our cohort shows 60% of the cohort were well nourished, 32% underweight, 4% were overweight and 4% obese. 22% of children who presented with diarrhea had vomiting, 50% were diagnosed to have moderate dehydration, 22% had mild dehydration, 2% were severely dehydrated and 26% had no dehydration. 90% children of our cohort were immunized up to date (or fully immunized) and only 6% were admitted as inpatients for IV rehydration. There was travel history in 8% of our cohort.

To ensure compliance-patient contact were made on the same time of the day and by the same person. 60% of children had a frequency of 3 or less loose stools on day 2 and 90% had 3 or less stools

## 4. Discussion

Indian studies in children have shown *Lactobacillus rhamnosus* GG to be effective in acute gastroenteritis when administered in the first day of onset of diarrhea [5, 6]. *Lactobacillus rhamnosus* GG in a dose of 6 billion CFU per day for five days given to children aged under sixteen during an episode of acute diarrhoea resulted in shortening of the duration of diarrhoea and faster improvement in stool consistency and frequency. The benefits were seen irrespective of their nutritional status.

There are various theories and mechanisms of action postulated about *Lactobacillus rhamnosus* GG in its mechanism of action. *Lactobacillus rhamnosus* GG is a probiotic that is isolated from healthy human intestines. It has exceptionally high binding ability to mucus and epithelial cells of the intestines due to its specialized SpaCBA pili structure. Upon colonization, it exerts antimicrobial, anti-toxin, anti-inflammatory and anti-hypersecretory effects besides strengthening intestinal mucosal barrier, stimulating synthesis of Vitamins B1, B2, B9 and increasing immunity.

Our cohort was given *Lactobacillus rhamnosus* GG based upon the Asia-Pacific guidelines for the management of acute gastroenteritis in children [7]. The results that are seen on this study do not reflect upon the other *Lactobacillus* species that are available as probiotics in India.

We understand the limitations of the study are the small size, it's an "observational" study with a lack of control group. We did not monitor for particular side effects for *Lactobacillus rhamnosus* GG bacteremia. Our follow up was robust with a patient helpline to return our calls or clarify any queries. Although our sample size is very small, response to the probiotic *Lactobacillus rhamnosus* GG was noted in reduction in the stool frequency and improvement in stool consistency on day 2 and day 5. The results that are noted in our cohort need to be translated to larger groups by larger multi-center trials.

## 5. Statistical Analysis

All statistical analysis was performed using Statistical Package for Social Science (SPSS, version 17) for Microsoft windows. Parametric / Non Parametric tests were performed because data was not uniformly distributed. Descriptive statistics were presented as numbers and percentages. The data were expressed as Mean and SD. Paired sample test/ Wilcoxon signed rank test were used. A two sided p value < 0.05 was considered statistically significant.

### What this study adds

*Lactobacillus rhamnosus* GG should be considered as an adjuvant therapy in the management of acute paediatric diarrhea along with Zinc and ORS.

*Lactobacillus rhamnosus* GG used in this study was SUPERFLORA GG<sup>®</sup> Manufactured by Sundyota nomandis, India.

## References

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