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Short communication

Probiotics in the management of atopic dermatitis in the pediatric population: a review of current evidence

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Introduction

Atopic dermatitis (AD) is a chronic, relapsing inflammatory skin disorder that affects up to 20% of children worldwide, rendering it one of the most prevalent dermatological conditions in the pediatric population. The disease is characterized by intense pruritus, xerosis, and recurrent eczematous lesions, which substantially impair the quality of life of affected children and their families. Although the precise pathogenesis of AD is complex and not yet fully elucidated, genetic predisposition, epidermal barrier dysfunction, immune dysregulation, and environmental influences are recognized as significant contributors to disease development. (EAACI, 2020).

In recent years, considerable scientific attention has been focused on the role of the gut microbiota in immune system maturation and the pathogenesis of allergic diseases. Alterations in the composition and diversity of the intestinal microbiota have been associated with an elevated risk of atopic disorders, including atopic dermatitis (EAACI, 2020; World Allergy Organization, 2015). This association has stimulated growing interest in the gut–skin axis, a bidirectional communication network that links intestinal microbial communities with systemic immune responses and cutaneous health.

Objective

The objective of this review is to critically evaluate the existing body of evidence concerning the use of probiotic supplementation for the prevention and management of atopic dermatitis in the pediatric population. Particular emphasis is placed on the role of the gut–skin axis, the influence of gut microbiota on immune system development, and the potential mechanisms by which probiotics may modulate inflammatory responses associated with atopic dermatitis. Furthermore, this review seeks to assess the efficacy, safety, and clinical relevance of various probiotic strains investigated in randomized controlled trials and meta-analyses, while identifying current limitations within the literature and highlighting areas that warrant further investigation.

Methods

A narrative review of published systematic reviews, meta-analyses, and randomized controlled trials evaluating probiotic use in pediatric patients with atopic dermatitis was conducted. Studies assessing clinical severity scores, symptom improvement, and safety outcomes were examined.

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(Huang et al., 2017; Kim et al., 2014; Makrgeorgou et al., 2018).

Current evidence and practical considerations

Current evidence suggests that probiotic supplementation may exert beneficial effects on the severity and clinical course of atopic dermatitis in children. Several randomized controlled trials and meta-analyses have reported significant reductions in SCORAD (Scoring Atopic Dermatitis) scores following administration of specific probiotic strains, particularly *Lactobacillus rhamnosus* GG, *Lactobacillus fermentum*, *Lactobacillus salivarius*, and various *Bifidobacterium* species (Kim et al., 2014; Huang et al., 2017; Navarro-López et al., 2018). The observed benefits appear to be more pronounced in children with moderate-to-severe disease and in those receiving probiotic supplementation for extended periods (Navarro-López et al., 2018).

Proposed mechanisms underlying these effects include modulation of gut microbiota composition, enhancement of intestinal barrier function, promotion of regulatory T-cell activity, and suppression of pro-inflammatory cytokine production (World Allergy Organization, 2015; EAACI, 2020). These immunomodulatory actions may contribute to improved immune tolerance and reduced allergic inflammation.

Despite these encouraging findings, substantial heterogeneity exists among studies regarding probiotic strains, combinations of microorganisms, dosage, treatment duration, age of participants, and outcome measures. Consequently, the magnitude of clinical benefit varies considerably across investigations, with some studies demonstrating significant improvements in disease severity and quality of life, while others report limited or no statistically significant effects (Huang et al., 2017; Makrgeorgou et al., 2018).

Overall, probiotic supplementation appears to be a promising adjunctive strategy for the management of pediatric atopic dermatitis by modulating the gut microbiota and influencing immune regulation, thereby contributing to reduced disease severity and improved quality of life (Huang et al., 2017; Kim et al., 2014). However, additional large-scale, rigorously designed randomized controlled trials are needed to establish standardized treatment protocols, identify the most effective probiotic formulations, and determine the long-term clinical effects of supplementation (Makrgeorgou et al., 2018; EAACI, 2020).

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