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USE OF PROBIOTICS IN ATOPIC DERMATITIS IN CHILDREN

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Abstract: Introduction: Atopic dermatitis (AD) is a dermatological disease that usually begins in childhood and is inflammatory in nature. It is characterized by a multifactorial cause, involving genetic and environmental factors, often associated with a history of atopy. The diagnosis of AD is clinical and is characterized by erythematous plaques, oedema, vesicles and itching in the area. Treatment varies according to the level and severity of the lesions and usually involves topical corticosteroids, antihistamines, systemic steroids and antibiotics. However, prolonged use of these drugs can lead to side effects. The use of probiotics has been studied as an approach to controlling AD in children. Aim: To study the impact of using probiotics as a therapeutic strategy to treat atopic dermatitis in children. Method: Integrative literature review carried out with the findings of the PubMed database, considering studies published between 2019 and 2024. Only randomized studies were selected. The keywords used were "probiotics", "atopic dermatitis" and "children". Results: According to the findings, probiotics act as immunomodulators and are capable of reducing the inflammatory response by acting to strengthen dermal barrier. As a result, in most studies there was a reduction in the SCORAD system, which classifies moderate to severe AD. Conclusion: The study revealed important results in relation to the use of probiotics as an intervention for AD. However, more comprehensive and standardized studies are still needed to develop consistent protocols.
Keywords: atopic dermatitis, children, probiotic

INTRODUCTION

TOPIC DESCRIPTION

Atopic dermatitis (AD), also known as atopic eczema, is a chronic inflammatory dermatological disease that usually begins in childhood. It is a common and complex disease that results in a disturbance in the function of the epidermal barrier, manifested clinically with itching and recurrent eczema-like lesions and xeroderma (dry skin). Eczema is characterized by ill-defined erythema, oedema and vesicles in the acute stage and, in the chronic stage, by well-defined erythematous, desquamative plaque with a variable degree of lichenification. (LARA, 2015)(ASBAI, SBP, 2022) (ASBAI, SBP, 2017)

It has a multifactorial etiopathogenesis, is the result of a complex interaction between genetic and environmental factors, often patients have a family and personal history of atopy and first manifestations before the age of two. (LARA, 2015)(ASBAI, SBP, 2022) (OLIVEIRA, 2022)

As with other diseases of this type, AD has an impact on the quality of life of children who have to live with the pathophysiology of this disease due to its relapsing and chronic nature. Itching is constant and uncontrollable, and is one of the factors responsible for reducing the quality of life of patients and their families. The characteristics and location of the lesions vary with age, which makes it possible to divide the disease clinic into age groups. (LARA, 2015) (OLIVEIRA, 2022) (ASBAI, SBP, 2017)

The diagnosis of AD is essentially clinical, and the main symptom of the disease is pruritus. The Hanifin&Rajka criteria have long been used, which take into account aspects such as chronicity, relapses, the distribution of the lesions according to age and the impairment of the patient's quality of life, which are of great importance both for diagnosis and for classifying the severity of the disease. (LARA, 2015) (ASBAI, SBP, 2017)

The Hanifin&Rajka criteria establish major and minor criteria defining atopy. Three major and three minor associated criteria are required for confirmation. They were described in the 1980s and are widely used in clinical practice, with a sensitivity of up to 96%. (LARA, 2015) (ASBAI, SBP, 2017)

The SCORAD (Scoring Atopic Dermatitis) system is an index responsible classifying moderate to severe AD, assessing the extent and severity of eczema in clinical trials. It is a highly reliable and validated tool. It is based a composite score, which uses objective and subjective criteria, such as the extent and intensity of the lesions, as well as daily pruritus and insomnia, respectively. Its values correspond to the range between 0 (lowest possible score) and 103 (highest possible score) and its interpretation is given as follows: < 25: mild AD; 25-50: moderate AD; > 60: severe AD. (AHN, 2020)

The treatment of AD varies according to the levels of lesions and severity and aims to improve the patient's quality of life, reduce pruritus and maximize disease-free periods. Children with AD are typically treated with topical corticosteroids, antihistamines, systemic steroids and antibiotics. However, prolonged use of these drugs can induce various adverse effects (JEONG, 2020) (ASBAI, SBP, 2022).

Due to the need for new therapeutic approaches, the use of probiotics has currently been widely researched as a complementary possibility in the management of atopic dermatitis (JEONG, 2020).

METHOD

This study is an integrative literature review with a qualitative approach on the use of probiotics in atopic dermatitis in children. Articles published in Portuguese and English and available to read in full on the management atopic dermatitis in children through the use of probiotics were selected. In order to keep to relevant and current information on the subject, a time restriction was applied with studies published between 2019 and 2024.

The starting point for the study was the PICO strategy, which means Patient, referring to the person and/or problem, Intervention, related to the intervention, Comparison, comparison and Outcomes, referring to the results. Thus, in the research, it was follows: P: pediatric patient with atopic dermatitis; I: use of probiotics; C: other drugs; O: reduction in AD flares.

The database used was PubMed and the key terms chosen for the search were "probiotics", "atopic dermatitis" and "children" separated by the Boolean operator "AND". Finally, a determining factor in the number and type of studies obtained from this research was the selection filter for randomized studies. Exclusion criteria included the non-child population or the use of other drugs in the management of atopic dermatitis, studies with no clinical outcome or incomplete studies, opinion articles, editorials, ministerial documents, monographs, technical reports, book chapters, theses, dissertations and duplicate articles.

RESULTS AND DISCUSSION

By applying the methodological criteria established above, seven articles were selected to make up the literature review, which are shown in Table 1. An integrative review covers information that supports, or not, the use of probiotics in childhood atopic dermatitis, based on an analysis of studies that have already been published.

Cukrowska et al. evaluated the efficacy of a probiotic preparation comprising *Lactobacillus rhamnosus* and *Lactobacillus casei* in children under 2 years of age with AD and cow's milk protein allergy compared to a placebo group. After three months of intervention, the results showed the probiotic preparation to be superior to placebo in terms of primary outcomes, and this was due to the benefit observed in improving symptom severity in allergen-sensitized patients. There was a significant improvement in the severity of AD symptoms assessed using the SCORAD index. (CUKROWSKA, 2021)

A randomized, double-blind, controlled study was carried out by Carucci et al. with 100 children with AD, comparing the results of a group that received placebo and another that received *Lacticaseibacillus rhamnosus* GG (LGG). It was observed that after supplementation for twelve weeks the SCORAD index decreased significantly, as well as an improvement in the quality of life of pediatric patients with AD. It was also possible to observe a reduction in the use of topical steroids among the patients groups. The benefits are mutual in terms of the severity of the disease and the patient's quality of life, as well as the beneficial modulation of the intestinal and skin microbiome (CARUCCI, 2022).

Rather et al. prospected ninety children to evaluate the effect of administering live and dead *L. sakei* proBio65 cells compared to a placebo group. Efficacy was assessed taking into account analyses made at the beginning of the study, after six weeks and at the end of the study (twelve weeks). Changes in SCORAD score, IGA score, serum inflammatory markers such as IgE and eosinophil cationic protein, and changes in skin condition were taken account. The results showed that both types of L. sakei probio65 cells decreased the SCORAD score and increased the sebum content of the skin, which suggests potential improvements in skin barrier functions and positive improvement in the relief of AD symptoms following their administration. (RATHER, 2021)

The use of a mixture of probiotic strains was tested by Feíto-Rodriguez et al. in order to measure its efficacy and the effect of the intervention on the total dose of corticosteroids administered to AD patients. Bifidobacterium lactis, Bifidobacterium longum and Lactobacillus casei were used in the probiotic mixture over 12 weeks and compared to the placebo group. As in the other studies, efficacy was assessed by the SCORAD score, which showed a significant decrease in the probiotic group. There was also an improvement in the IGA score and a statistically significant reduction in the probiotic group when compared to the placebo group in the total number of days and the total amount of topical corticosteroids required by the patient between the sixth and final week. (FEÍTO-RODRIGUEZ, 2023)

Another probiotic, *Lactobacillus pentosus*, was tested on children and adolescents diagnosed with AD, aged between 2 and 13. A randomized study was carried out in which half of a group of 82 children and adolescents were selected to receive Lactobacillus Pentosus and the other half placebo for a period of 12 weeks. The clinical severity of AD, transepidermal water loss and blood eosinophil count were assessed in this study,

Total serum IgE and cytokine levels, as well as analysis of the diversity and composition of the gut microbiota. In the last week of the study, there was a significant decrease in SCORAD in both groups, however, the average subjective scores for the probiotic group are significantly improved compared to those for the placebo group in allergen-sensitized AD. Other parameters showed no significant differences. The study showed improvements in symptoms in both groups, however, no additional effects were found from the use of Lactobacillus Pentosus. (AHN, 2020)

Author	Year of study	Study title	Type of study	Number of patients	Conclusion
Cukrowska et al.	2021	The Effectiveness of Probiotic Lactobacillus *rhamnosus* and Lactobacillus casei Strains in Children with Atopic Dermatitis and Cow's Milk Protein Allergy: A Multicenter, Randomized, Double Blind, Placebo Controlled Study	Multicenter, randomized, double-blind, placebo-controlled study and placebo--controlled.	151	Administration of a probiotic mixture containing strains of *Lactobacillus rhamnosus* and *Lactobacillus casei* is safe and induces beneficial effects, especially in patients sensitized to allergens. Supplementing the children's diet with the probiotic preparation for three months resulted in a significant improvement in the severity of AD symptoms assessed using the SCORAD index.
Carucci et al.	2022	Therapeutic effects elicited by the probiotic Lacticaseibacillus rhamnosus GG in children with atopic dermatitis. The results of the ProPAD trial	Clinical trial randomized, double-blind and placebo--controlled.	100	The probiotic LGG may be useful as an adjuvant therapy in pediatric AD. The beneficial effects on disease severity and quality of life were paralleled by a beneficial modulation of the gut and skin microbiome.
Rather et al .	2021	Oral Administration of Live and Dead Cells of Lactobacillus sakei proBio65 Alleviated Atopic Dermatitis in Children and Adolescents: a Randomized, Double-Blind, and Placebo-Controlled Study	Randomized study, double-blind and placebo-controlled.	90	The total SCORAD score decreased in living cells and in the baseline dead cell group after 12 weeks, while there were no significant significant changes in the placebo group when compared to baseline. Suggests improvements in skin barrier functions. Current data suggest a positive improvement in the relief of AD symptoms after oral administration of L. sakei proBio65 in viable and non-viable forms.
Feíto-Rodríguez et al.	2023	Randomized double-blind placebo-controlled clinical trial to evaluate the effect of a mixture of probiotic strains on symptom severity and use of corticosteroids in children and adolescents with atopic dermatitis	Clinical trial double-blind, randomized e controlled by placebo	70	The probiotic mixture used in this clinical trial demonstrated effectiveness in change in the index index activity da DA in compared to placebo. In , the total number of days and the total amount from topical corticosteroids needed by participants group group probiotic showed a significant significant in comparison with placebo between 6 and 12 weeks.
Ahn et al.	2020	Effects of Lactobacillus pentosus in Children with Allergen--Sensitized Atopic Dermatitis.	Clinical trial randomized e controlled by placebo	82	Results show symptoms improved in groups probiotics e placebo, e was not was found additional effects of *L. pentosus* in AD. In however, the scores subjective averages of indexes SCORAD to group probiotic are significantly improved in comparison with those for the group placebo in sensitized AD to allergens.
D'Auria et al.	2021	Rice flour fermented with Lactobacillus paracasei CBA L74 in the treatment of atopic dermatitis in infants: A randomized, double-blind, placebo-controlled trial	Prospective, randomized, double-blind, placebo-controlled study	58	The present study did not prove the efficacy of a fermented rice flour obtained from heat-treated *Lactobacillus paracasei* CBA L74 as a complementary approach in significantly reducing the severity of AD. However, *Lactobacillus paracasei* CBA L74 killed by heating showed a corticosteroid-sparing effect beyond the treatment period. This issue deserves in light of the growing interest in steroid-sparing strategies.
Jeong et al.	2020	A randomized trial of Lactobacillus rhamnosus IDCC 3201 tyndallizate (RHT3201) for treating atopic dermatitis.	Randomized, double-blind placebo-controlled study.	100	In children with moderate AD, oral administration of RHT3201 showed a therapeutic effect on AD, the effects in correlated with a decrease in ECP and IL-31, and the effect was more noticeable in subgroup analysis.

Table 1. Studies included in the integrative literature review

Source: Own elaboration

D'Auria et al. evaluated the effect of a fermented rice flour obtained from *Lactobacillus Paracasei* CBA L74 in the treatment of 58 infants aged between 6 and 36 months with moderate to severe atopic dermatitis. The study included 58 infants who were randomly divided into the probiotic and placebo groups and evaluated over a 12-week period, correlating the SCORAD score and the composition of the microbiota. There was a decrease in the SCORAD score in the probiotic group, but the difference observed was below the minimum clinical difference required by the study. This group also showed a reduction in the use of corticosteroids, with a significant difference one month after stopping treatment. No significant changes were observed in cytokine levels between the groups or in the composition of the intestinal microbiota. , the present study did not prove to be effective in using fermented rice flour obtained from *Lactobacillus paracasei* CBA L74 as a complementary measure in reducing the severity of AD. (D'AURIA, 2021)

The efficacy of tindalized Lactobacillus rhamnosus IDCC 3201 was evaluated by Jeong et al in a randomized, double-blind, placebo-controlled study. For 12 weeks, 100 children, aged between 1 and 12 years, diagnosed with moderate AD were evaluated. Significant results were observed in the control group; there was a therapeutic effect on AD, with a decrease in eosinophil cationic protein and interleukin levels. The primary endpoint was met with a significant decrease in the total SCORAD score of the control group compared to the placebo group at week 12. In addition, no problems in relation to the safety of the use of the probiotic, it proved to be safe. Thus, the oral use of Lactobacillus rhamnosus IDCC 3201 has shown its therapeutic effect for the treatment of moderate atopic dermatitis in children. (JEONG, 2020)

CONCLUSION

Atopic dermatitis (AD) is a chronic condition that significantly affects the quality of life of patients and their families.

This work has revealed important results in relation to the use of probiotics, highlighting the improvement in the SCORAD score (CUKROWSKA, 2021), the modulation of the microbiome (CARUCCI, 2022) and the reduction in the use of corticosteroids (FEÍTO-RODRIGUEZ, 2023). However, the effectiveness varies between the different studies, but a general positive impact is observed.

On the other hand, some studies show limitations in terms of efficacy and a lack of significant differences. Thus, although safe, more comprehensive and standardized studies are needed to develop consistent protocols and identify the most effective strains and dosages.

The use of probiotics can be considered a viable complementary alternative, but the treatment of AD must respect multidisciplinary management, always analyzing the particularities of each patient and being guided by up-to-date scientific evidence.

REFERENCES

AHN, So Hyun *et al*. Effects of Lactobacillus pentosus in Children with Allergen-Sensitized Atopic Dermatitis. **Journal of Korean Medical Science**. 2020. Disponível em: doi: 10.3346/jkms.2020.35.e128. Acesso em: 15 out. 2024.

ASSOCIAÇÃO BRASILEIRA DE ALERGIA E IMUNOLOGIA (ASBAI) E SOCIEDADE BRASILEIRA DE PEDIATRIA (SBP). **Guia prático de atualização em dermatite atópica - Parte I: etiopatogenia, clínica e diagnóstico.** Posicionamento conjunto da Associação Brasileira de Alergia e Imunologia e da Sociedade Brasileira de Pediatria. 2017;1(2):131-56. Disponivel em: https://www.sbp.com.br/fileadmin/user_upload/Consenso_-_Dermatite_Atopica_-_vol_1_n_2_a04 1_.pdf. Acesso em: 08 out. 2024

ASSOCIAÇÃO BRASILEIRA DE ALERGIA E IMUNOLOGIA (ASBAI) E SOCIEDADE BRASILEIRA DE PEDIATRIA (SBP). **Guia prático de atualização em dermatite atópica - Parte II: abordagem terapêutica.** Posicionamento conjunto da Associação Brasileira de Alergia e Imunologia e da Sociedade Brasileira de Pediatria. 2017;1(2):157-82. Disponível em: https://www.sbp.com.br/fileadmin/user_upload/Consenso_-_Dermatite_Atopica_-_vol_2_n_2_a04 1_.pdf. Acesso em: 08 out. 2024

ASSOCIAÇÃO BRASILEIRA DE ALERGIA E IMUNOLOGIA (ASBAI) E SOCIEDADE BRASILEIRA DE PEDIATRIA (SBP). **Dermatite atópica grave: guia prático de tratamento da Associação Brasileira de Alergia e Imunologia e Sociedade Brasileira de Pediatria.** 2022. Disponível em: http://aaai-asbai.org.br/detalhe_artigo.asp?id=1324. Acesso em: 08 out. 2024

CARUCCI, Laura et al. Therapeutic effects elicited by the probiotic Lacticaseibacillus rhamnosus GG in children with atopic dermatitis. The results of the ProPAD trial. **Pediatr Allergy Immunol**. 2022 Aug; 33(8):e13836. Disponível em: doi: 10.1111/pai.13836. Acesso em: 13 out. 2024.

CUKROWSKA, Bozena *et al*. The Effectiveness of Probiotic Lactobacillus rhamnosus and Lactobacillus casei Strains in Children with Atopic Dermatitis and Cow's Milk Protein Allergy: A Multicenter, Randomized, Double Blind, Placebo Controlled Study. **Nutrients.** 2021 Abr [Citado 2022 nov. 4]; 13(4):1169. doi: 10.3390/nu13041169. Acesso em: 13 out. 2024.

D'AURIA, Enza *et al.* Rice flour fermented with Lactobacillus paracasei CBA L74 in the treatment of atopic dermatitis in infants: A randomized, double- blind, placebo- controlled trial. **Pharmacological Research.** 2021 Jan [Citado 2022 nov.4]; 163:105284. Disponível em: https://doi.org/10.1016/j.phrs.2020.105284. Acesso em: 13 out. 2024.

FEÍTO-RODRÍGUEZ, Marta *et al.* Randomized double-blind placebo-controlled clinical trial to evaluate the effect of a mixture of probiotic strains on symptom severity and use of corticosteroids in children and adolescents with atopic dermatitis. **Clin Exp Dermatol.** 2023 Apr 27;48(5):495-503. Disponível em: doi: 10.1093/ced/llad007. Acesso em: 13 out. 2024.

JEONG, Kyunguk *et al.* A randomized trial of Lactobacillus rhamnosus IDCC 3201 tyndallizate (RHT3201) for treating atopic dermatitis. **Pediatr Allergy Immunol.** 2020 Out [Citado 2022 nov.4];31(7):783-792. Disponível em: https://onlinelibrary.wiley.com/doi/10.1111/pai.13269. Acesso em 15 out. 2024.

LARA, Myrian *et al.* Há lugar para o uso de probióticos na prevenção e no tratamento da dermatite atópica pediátrica? **Rev Med Minas Gerais.** 2015; 25 (Supl 6): S52-S60. Disponível em: doi: 10.5935/2238-3182.20150097. Acesso em 10 out. 2024.

OLIVEIRA, Samara. Uso de probióticos em crianças e adolescentes com dermatite atópica: o que há de mais recente e atualizações. **BWJS**. 2022 [citado 9º de setembro de 2024]; 5:1-9. Disponível em: https://bwsjournal.emnuvens.com.br/bwsj/article/view/351. Acesso em 22 out. 2024.

PAGE, Sarah *et al.* Atopic dermatitis in children. **Aust Fam Physician.** 2016 Mai [Citado 2022 nov.4];45(5):293-296. Disponível em: https://www.racgp.org.au/afp/2016/may/atopic-dermatitis-in-children/. Acesso em 20 out. 2024.

RATHER, Irfan *et al*. Oral Administration of Live and Dead Cells of Lactobacillus sakei proBio65 Alleviated Atopic Dermatitis in Children and Adolescents: a Randomized, Double-Blind, and Placebo-Controlled Study. **Probiotics Antimicrob Proteins.** 2021 [Citado 2022 nov.4];13(2):315-326. Disponível em: doi: 10.1007/s12602-020-09654-7. Acesso em 20 out. 2024.