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Comparison of the Efficacy of Probiotics Versus Placebo in the Treatment of Atopic Dermatitis in Children

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ABSTRACT

Objective: To evaluate the efficacy of probiotics in the treatment of atopic dermatitis in children.
Study Design: Comparative cross-sectional study.
Place and Duration of Study: Dermatology Department, Pak Emirates Military Hospital Rawalpindi, Pakistan, from Jan to Sep 2015.
Methodology: A total of 170 patients with atopic dermatitis fulfilling the inclusion criteria were selected. Patients were divided into two groups. The treatment Group (Group-A) received probiotics (Saccharomyces Boulardii) twice daily for six weeks. The Control Group (Group-B) received an equal volume of placebo (powdered milk without probiotics) twice a day for the same duration. Both groups were prescribed emollients as adjuvant therapy for atopic dermatitis. The treatment efficacy was assessed using the SCORAD index calculated at baseline (before starting treatment) and at the end of the study (6 weeks after treatment).
Results: Clinical efficacy was seen in 51 patients (60.0%) of the Treatment-Group compared to 37 patients (43.53%) of the Control-Group at the end of six weeks of treatment. The results were statistically significant (p-value =0.03).
Conclusion: Probiotics have a significant role in improving treatment outcomes in patients with atopic dermatitis.

Keywords: Atopic dermatitis, Children, Management, Probiotics, Saccharomyces boulardii,

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INTRODUCTION

Atopic dermatitis is one of the very common skin conditions. It is a major public health problem which affects 2–5% of young adults and up to 20% of children worldwide.[1] It has an allergic origin in almost half of the cases. The skin is dry. The hallmark symptom is pruritus, disturbing and leads to skin excoriations. Therefore, it affects the quality of life of the patients as well as their relatives.[2]

Nearly half of these patients develop symptoms within their first year of life. Around 95% have onset of symptoms before reaching their fifth birthday.[3] About two third of these patients have spontaneous remission before adolescence, while the rest enter adulthood with eczema or have a relapse of eczema. Children suffering from atopic dermatitis have a higher incidence of other atopic diseases. This risk increases with the severity of the disease. Nearly half of the moderate to severely affected atopic dermatitis patients develop asthma. At the same time, up to two-thirds of such patients may develop allergic rhinitis.[4,5]

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The optimal management of atopic dermatitis needs a holistic approach involving eliminating exacerbating factors, restoring the skin barrier and maintaining skin hydration. Patient education and pharmacologic treatment of skin inflammation are also important in management.[6,7] Hydrating topical treat-ment and avoidance of provocation factors is the baseline management. Topical corticosteroids and topi-cal calcineurin inhibitors are the mainly used antiin-flammatory agents. While severe and refractory cases may need systemic anti-inflammatory agents. Anti-microbials or antiseptics may be added for treating microbial colonization and superinfection. Systemic antihistamines help in itch relief only. Ultraviolet irradiation preferably ultraviolet A1 or narrow band ultraviolet B may be added adjuvantly. Dietary recom-mendations and immunotherapy targeting aeroaller-gens may be helpful in a few patients. Psychological counselling has a role in cases of stress-induced exacerbations.[8]

The role of probiotics in managing atopic dermatitis is a novel concept. Oral probiotics are helpful in the management of atopic dermatitis. These help in the restoration of the barrier function of the intestinal mucosa. Probiotics degrade food antigens and regulate the microbial composition of the intestines. These pro-

mote secretory IgA production and stimulate T helper-1 immune response, thus blocking T helper-2 allergic responses. All these regulate local and systemic immunity and lead to a reduction in the severity of clinical symptoms.[9]

Many studies have evaluated the potential role of probiotics in the prevention and treatment of many diseases, including allergic diseases, particularly atopic dermatitis. The therapeutic role of probiotics in atopic dermatitis seems promising.[2] In a recent study, significant improvement in the SCORAD index was seen with probiotics treatment (65%) compared with the placebo (46%).[9] As no such study has been conducted in this region and the results of recent studies in other parts of the world have shown probiotics to be safe and effective, and this study was designed to compare the efficacy of probiotics with placebo in the treatment of atopic dermatitis for better patient management and care.

METHODOLOGY

This study was carried out at the Dermatology Outpatient Department of Pak Emirates Military Hospital Rawalpindi, Pakistan, from January to September 2015 after IERB approval. The sample size was calculated by the World Health Organisation sample size calculator, taking the significance level of 5% and power of test 80% with anticipated population proportion P1 of 65% and anticipated population proportion P2 of 46%9. The sampling technique was non-probability consecutive sampling.

Inclusion Criteria: Children suffering from atopic dermatitis for more than one month were included in the study.

Exclusion Criteria: Patients with a history of exposure to commercial probiotic products during the previous four weeks and those having any gastrointestinal disorder or on antibiotics, systemic corticosteroids, or immunosuppressants were excluded from the study.

A total of 170 patients with atopic dermatitis fulfilling the inclusion criteria were selected, with 85 patients in each Group, after written informed consent. The diagnosis of atopic dermatitis was confirmed using UK working party diagnostic criteria.[10]

Patients were divided into Group-A (Treatment Group) and Group-B (Placebo Group) using random numbers table. Group-A received probiotics (Saccharomyces Boulardii) twice daily for six weeks. Group-B received an equal volume of placebo (powdered milk without probiotics) twice a day for the same time. Both supplements were dispensed as stable powder in separate 250 mg sachets in similar packing. These were reconstituted by parents with 5–10 ml of water and given orally as a suspension. Compliance was followed by sachet counts. Both groups were prescribed emollients which is the standard therapy for atopic dermatitis. The probiotics/placebo were given for added benefit. The assessment of treatment efficacy was based on the SCORAD index9which was calculated at the beginning and the end of six weeks of treatment. At least a 25% or more reduction in the SCORAD index of each patient from the baseline score was considered an effective therapeutic response.

Statistical Package for Social Sciences (SPSS) version 23.0 was used for the data analysis. For qualitative variables like (gender and efficacy), frequency and percentages were calculated. For quantitative variables like (age and duration of illness), the mean and standard deviation was calculated. The chi-square test was used to compare the efficacy. The *p*-value of≤0.05 was set as the cut-off value for significance.

RESULTS

A total of 170 cases (85 in each group) were included in the study. Their ages ranged from 2-12 years. The mean age was 5.98±2.53 and 6.07±2.55 years in Group-A and Group-B, respectively. Patients distribution according to gender showed that 48(56.4%) patients in Group-A and 40(47.0%) in Group- B were males, while 37 (43.5%) patients in Group-A and 45(52.9%) in Group-B were females (Table-I).

Table-I: Age and Gender Distribution of the Study Groups (n=170)

Age (in years)	Group-A n=85, n (%)	Group-B n=85, n (%)
2-7	63(74.1)	60(70.5)
8-12	22(25.8)	25(29.5)
Mean±SD	5.98±2.53 years	6.07±2.55 years
Gender		
Male	48(56.5)	40 (47.0)
Female	37(43.5)	45 (53.0)

Efficacy of treatment based on the SCORAD index. In Group-A efficacy was recorded in 51 (60.0%) patients, while in Group-B, it was noted in 37(43.5%) patients (*p* value=0.03) shown in Table-II.

DISCUSSION

Atopic dermatitis (AD) is one of the most common chronic inflammatory skin diseases in children.

The prevalence of AD has increased throughout the world in the recent few decades. Multiple risk factors include genetic, epigenetic, developmental, and environmental. Previously, proper skin care and topical corticosteroid therapy were considered the management standard for morbidity. However, unfortunately, poor compliance, recurrence and complications by using corticosteroids opened a new era of alternative therapeutics.[8]

Table-II: Comparison of Efficacy of Probiotics and Placebo in the Treatment of Atopic Dermatitis in Children (n=170)

Efficacy	Group-A n (%)	Group-B n (%)	*p*-value
Yes	51(60.0)	37 (43.5)	0.03
No	34 (40.0)	48 (56.5)	
Total	85	85	-

Probiotics include bacterial strains with an immunomodulatory capacity which may benefit health.[11] There is increasing evidence that specific strains of probiotics can have a significant role in the prevention and management of allergic disorders.[12]

We planned this study with the view that numerous studies have evaluated the possible role of probiotics in the prevention and treatment of human diseases, including allergic diseases, specifically atopic dermatitis. Moreover, earlier studies have shown encouraging therapeutic effects of probiotics in atopic dermatitis.[13]

The findings of our study are comparable with a recent study, where a significant improvement in SCORAD index was seen with probiotics treatment (65%) as compared with the placebo (46%).[9]

Supplementation of a probiotic mixture containing Lactobacillus paracasei and Lactobacillus fermentum resulted in the reduction of disease severity and improvement of quality of life and immune biomarkers in children withAD.[13] Prenatal followed by postnatal administration of probiotics (esp. Lactobacillus and Bifidobacterium) was protective against the development of paediatric AD in both general and allergic risk population.[14]

L. salivarius LS01 improved the quality of life of children with AD by reducing SCORAD and itch index after four weeks of treatment. The effect persisted after the cessation of probiotic supplementation.[15] Probiotics have a promising role in preventing AD when administered during the late pregnancy and early stages of life.[16]

A previous study evaluated the effect of Bifidobacterium breve M-16V, and Bifidobacterium longum BB536 administered prenatally over one month, during infancy for six months, and a follow-up period of 18 months on the management of allergic diseases. The study showed a lesser incidence of AD in the probiotic-administered cases compared to controls.[4]

The administration of a mixture containing oral probiotics for 12 weeks in children 4 to 17 years of age with moderate atopic dermatitis was useful. It reduced the SCORAD index and, at the same time, decreased the use of topical steroids in these cases.[17]

A meta-analysis of randomized controlled trials showed marked improvement in SCORAD values in probiotic-administered patients compared to the control. Using a mixture of different bacterial strains or Lactobacillus species was more effective than treatment with Bifidobacterium species alone. This metaanalysis suggests that probiotics could be a promising option in managing AD, especially in treating moderate to severe AD in children and adults.[18]

The role of probiotics in the prevention of atopic diseases and atopic sensitization has been evaluated in several trials, and there is compelling evidence for the effect on AD in early life.[19]

The results from our study and the data documented in other studies suggest that probiotics are more effective compared to placebo in treating children suffering from atopic dermatitis. However, further extended trials would be needed to validate these findings.

CONCLUSION

This study concluded that probiotics have a significant role in improving treatment outcomes in patients with atopic dermatitis.

Conflict of Intrest: None

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

SS: Drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

ZIS: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

NA: Study design, data analysis, critical review, drafting the manuscript, critical review, approval of the final version to be published.

SK: Data acquisition, data interpretation, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. Wollenberg A, Oranje A, Deleuran M, Simon D, Szalai Z, Kunz B, et al; European Task Force on Atopic Dermatitis/EADV Eczema Task Force. ETFAD/EADV Eczema task force 2015 position paper on diagnosis and treatment of atopic dermatitis in adult and paediatric patients. J Eur Acad Dermatol Venereol 2016; 30(5): 729-47. doi: 10.1111/jdv.13599.
2. Meneghin F, Fabiano V, Mameli C, Zuccotti GV. Probiotics and atopic dermatitis in children. Pharmaceuticals (Basel) 2012; 5(7): 727-744. doi: 10.3390/ph5070727.
3. Dilnawaz M, Sheikh ZI. Clinical audit of National Institute of Clinical Excellence (NICE) Technology Appraisal Guidance (TAG) 81 and 82/Clinical Guidelines (CG57) on atopic eczema in children. J Pak Assoc Derma 2013; 23: 47-51.
4. Rather IA, Bajpai VK, Kumar S, Lim J, Paek WK, Park YH. Probiotics and Atopic Dermatitis: An Overview. Front Microbiol 2016; 7: 507. doi: 10.3389/fmicb.2016.00507.
5. Thakur A, Malhotra S, Malhotra SK, Malhotra S. Bacteriological profile in atopic dermatitis: comparison between normal and lesional skin. J Pak Assoc Derma 2013; 23: 360-364.
6. Thomsen, SF, Atopic dermatitis: natural history, diagnosis and treatment. ISRN Allergy 2014; 2014: 354250. doi: 10.1155/2014/354250.
7. Eichenfield LF, Tom WL, Chamlin SL, Feldman SR, Hanifin JM, Simpson EL, et al. Guidelines of care for the management of atopic dermatitis: section 1. Diagnosis and assessment of atopic dermatitis. J Am Acad Dermatol 2014; 70(2): 338-351.
8. Darsow U, Wollenberg A, Simon D, Taïeb A. European Task Force on Atopic Dermatitis/EADV Eczema Task Force. ETFAD/EADV eczema task force 2009 position paper on diagnosis and treatment of atopic dermatitis. J Eur Acad Dermatol Venereol 2010; 24(3): 317-328. doi: 10.1111/j.1468-3083.2009.03415.x.
9. Yeşilova Y, Çalka Ö, Akdeniz N, Berktas M. Effect of probiotics on the treatment of children with atopic dermatitis. Ann Dermatol 2012; 24(2): 189-193. doi: 10.5021/ad.2012.24.2.189.
10. Watson W, Kapur S. Atopic dermatitis. Allergy Asthma Clin Immunol 2011; 7(1): S4. doi:10.1186/1710-1492-7-S1-S4
11. Chang YS, Trivedi MK, Jha A, Lin YF, Dimaano L. Synbiotics for prevention and treatment of atopic dermatitis: a meta-analysis of randomized clinical trials. JAMA Pediatr 2016; 170(3): 236-242. doi: 10.1001/jamapediatrics.2015.3943.
12. Nole KLB, Yim E, Keri JE. Probiotics and prebiotics in dermatology. J Am Acad Dermatol 2014; 71(4): 814-821. doi: 10.1016/j.jaad.2014.04.050.
13. Wang IJ, Wang JY. Children with atopic dermatitis show clinical improvement after Lactobacillus exposure. Clin Exp Allergy 2015 ; 45(4): 779-787. doi: 10.1111/cea.12489.
14. Panduru M, Panduru NM, Salavastru CM, Tiplica GS. Probiotics and primary prevention of atopic dermatitis: a meta-analysis of randomized controlled studies. J Eur Acad Dermatol Venereol 2015; 29(2): 232-242. doi: 10.1111/jdv.12496.
15. Niccoli AA, Artesi AL, Candio F, Ceccarelli S, Cozzali R, Ferraro L, et al. Preliminary results on clinical effects of probiotic Lactobacillus salivarius LS01 in children affected by atopic dermatitis. J Clin Gastroenterol. 2014; 48 Suppl 1:S34-36. doi: 10.1097/MCG.0000000000000233.
16. Madhok V, Futamura M, Thomas KS, Barbarot S. What's new in atopic eczema? An analysis of systematic reviews published in 2012 and 2013. Part 2. Treatment and prevention. Clin Exp Dermatol 2015; 40(4): 349-354; quiz 354-5. doi: 10.1111/ced.12591.
17. Navarro-López V, Ramírez-Boscá A, Ramón-Vidal D, Ruzafa-Costas B, Genovés-Martínez S, Chenoll-Cuadros E et al. Effect of oral administration of a mixture of probiotic strains on SCORAD index and use of topical steroids in young patients with moderate atopic dermatitis: a randomized clinical trial. JAMA Dermatol 2018 ; 154(1): 37-43. doi: 10.1001/jamadermatol.2017.3647.
18. Kim SO, Ah YM, Yu YM, Choi KH, Shin WG, Lee JY. Effects of probiotics for the treatment of atopic dermatitis: a meta-analysis of randomized controlled trials. Ann Allergy Asthma Immunol 2014; 113(2): 217-226. doi: 10.1016/j.anai.2014.05.021.
19. Avershina E, Cabrera Rubio R, Lundgård K, Perez Martinez G, Collado MC, Storrø O, et al. Effect of probiotics in prevention of atopic dermatitis is dependent on the intrinsic microbiota at early infancy. J Allergy Clin Immunol 2017; 139(4): 1399-1402.e8. doi: 10.1016/j.jaci.2016.09.056.