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# **Underrepresentation of atopic dermatitis publications in pediatric journals: a bibliometric analysis**

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## Abstract

Extensive research has been published on atopic dermatitis (AD), a prevalent skin condition amongst pediatricians. To assess the pediatric representation in the most cited literature on AD, using bibliometric analysis. Web of Science citation indexing database was used to identify publications with "atopic" and "dermatitis" or "eczema" in their title. Results were ranked by their Annual citation( $A_c$ ) and refined to the 100 topmost cited articles in the non-refined pediatric category and the top five journals in the categories of general medicine, dermatology, and pediatrics, by impact factor. 28,360 publications were retrieved. The metrics were significantly higher in dermatology, compared to pediatric and general categories [ $(R_{TC} = 0.899, p < .001)$ ,  $(R_{AC} = 0.795, p < .001)$ ,  $(R_{usage\ count} = 0.639, p < .001)$ ] and [ $(R_{TC} = 0.417, p < .001)$ ,  $(R_{AC} = 0.392, p < .001)$ ,  $(R_{usage\ count} = 0.279, p < .001)$ ]. This analysis is the first to highlight the underrepresentation of AD publications in the pediatric literature, which might impact the clinicians' and patients' level of care and AD annual societal expenditure.

## Introduction

Atopic dermatitis (AD) is the most common inflammatory skin disease, with a lifetime prevalence of 20%. Of the people affected by AD, 80% experienced disease onset prior to the age of six.<sup>1</sup> The global atopic dermatitis atlas (GADA) was launched in 2022 to address the growing burden of atopic dermatitis (AD), the impact on patients and their families, and geographical gaps. A recent global report as part of the GADA has revealed that AD affects up to 20% of children and 10% of adults aged between 20 and 25. According to the report, the prevalence of AD is highest in early childhood (1-4 years old), and it decreases until late adulthood when it increases again (above 65 years of age). AD is primarily treated by primary care physicians, pediatricians, allergologists, and pediatric dermatologists and by dermatologists and general physicians to a lesser extent.<sup>2</sup>

The journals impact factor (IF) reflects the annual citation of an average paper in a journal in the previous two years and thus, the importance of a journal and its relevance to its readers.<sup>3</sup> Moreover, a correlation was found between the height of journals IF and valid published research findings, meaning that studies that are published in the highest impact factor journals of a certain field will be the closest to reliable medical data regarding the published topic.<sup>4</sup> Furthermore, the higher the total citation of an article, the higher the impact of a certain research on the field.<sup>5</sup> Nevertheless, papers published in low IF journals may receive more citations than the IF of their journal.<sup>6</sup>

Thus, in order to investigate the pediatric representation in AD literature we aimed to analyze the 100 most cited articles on AD in the top five journals of the general medical field, dermatology, and pediatrics, according to IF. Additionally, we compared the 100 most cited articles in the non-

refined pediatric category to the pediatric literature to the above-mentioned categories. To the best of our knowledge, to this date, no comparative bibliometric analysis has been conducted to examine the representation of AD amongst the fields mentioned above.

## **Materials and Methods**

Search strategy: The five journals with the highest impact factor in the general medicine, dermatology, and pediatrics fields were identified according to the Web of Science (WebOS) Journal citation reports (2022) with no refinement for the general field and with refinement to the dermatology and pediatric categories in Webos. Furthermore, data were extracted from a non-refined pediatric category to include all of the pediatric journals in Webos.<sup>7</sup> The 100 most cited articles in each category were extracted via the WebOS citation indexing database on August 14<sup>th</sup>, 2023, a method previously described to analyze trends and gaps in literature.<sup>8,9</sup> The results were restricted to publications that included the keywords “atopic” and “dermatitis” or “eczema” in their title. The results were then refined to each category with the specific identified high IF journals to extract the 100 topmost cited publications in each category. The extracted data had no limitation on language or type of manuscript (original article, review, guidelines, etc). Approval from an ethics committee was not required, given that no patient data collection or intervention in animal or human experiments took place.

Data extraction and bibliometric parameters: The publications for each category were extracted to Microsoft Excel 2019. Title, total citations (TCs) by the webOS database, journal, and year of publication were retrieved. Additionally, Webos usage count since 2013, a piece of data that states the number of times that the publication was fully accessed since 2013, was derived from the search results. Furthermore, Journal IFs were acquired from the 2022 webOS database.<sup>7</sup> Annual citation (AC), the division of TCs by how old the publication is – has been described as a tool to counter the bias arising from older publications having more prominent citations over time.<sup>10-11</sup>

Statistical analysis: Statistical analysis was done on JASP<sup>12</sup>. The normality of data was assessed using the Shapiro-Wilk test. Due to the lack of normal data distribution, statistical differences were evaluated for non-parametric data using the Mann-Whitney test with a power of 95%,  $p < 0.05$ . The R parameter of each metric refers to the effect size, as calculated in JASP, with the data regarding the variable entered and compared between two categories.

## **Results**

A total of 28,360 publications were retrieved. Upon refinement, 201, 4,234, and 110 publications were retrieved from the top five journals in the general medicine, dermatology, and pediatric categories. The 100 most cited articles in each category were selected and are presented in

supplemental tables 1, 2, and 3, respectively. The range of TC (total citations) for the general medicine, dermatology, and pediatric fields was between 10 and 2,929, 144 and 782, and 0 and 484, respectively. The summary of TC for the general, dermatology, and pediatric fields was 24,653, 23,901, and 4,832, respectively. The titles of the 15 top journals in the three categories, alongside their impact factor (2022) and their respective number of publications in the 100 most cited articles in each field, are seen in supplementary table 4.

The journals with the highest AC (Figure 1) and publications usage count since 2013 (Figure 2) in general medicine, dermatology, and pediatric fields were the “*Lancet*,” the “*Journal of The American Academy of Dermatology*” (JAAD), and “*Pediatrics*,” respectively. When comparing the TC, AC, and usage count since 2013 of each category, dermatology publications were significantly higher in these metrics than publications in the general category [( $R_{TC} = 0.417$ ,  $p < .001$ ), ( $R_{AC} = 0.392$ ,  $p < .001$ ) and ( $R_{usage\ count} = 0.279$ ,  $p < .001$ )]. When refined to the 100 most cited publications in the top five journals in pediatrics, the articles were significantly lower with regards to TC, AC and usage count than the top 100 articles in the general medicine journals [( $R_{TC} = 0.564$ ,  $p < .001$ ), ( $R_{AC} = 0.437$ ,  $p < .001$ ) and ( $R_{usage\ count} = 0.287$ ,  $p < .001$ )]. Furthermore, they were significantly lower in these metrics compared to the dermatology journals [( $R_{TC} = 0.899$ ,  $p < .001$ ), ( $R_{AC} = 0.795$ ,  $p < .001$ ) and ( $R_{usage\ count} = 0.639$ ,  $p < .001$ )].

Further comparison was conducted with regard to the non-refined pediatric category. The top 100 most cited publications in the top five pediatric journals were compared to the top 100 most cited non-refined pediatric category in Webos, as presented in supplementary table 5. This comparison resulted in significantly lower TC, AC, and usage count in the former compared to the latter [( $R_{TC} = -0.714$ ,  $p < .001$ ), ( $R_{AC} = -0.601$ ,  $p < .001$ ) and ( $R_{usage\ count} = -0.468$ ,  $p < .001$ )]. When compared to the 100 most cited publications in the non-refined pediatric category, the 100 most cited publications in the top five journals in the field of dermatology were significantly higher in TC, AC, and usage count [( $R_{TC} = 0.715$ ,  $p < .001$ ), ( $R_{AC} = 0.516$ ,  $p < .001$ ) and ( $R_{usage\ count} = 0.273$ ,  $p < .001$ )]. No significant results were found when comparing the former and the top five journals in general medicine.

## **Discussion and Conclusions**

In this analysis, we found a significant underrepresentation of AD publications within the top five journals in pediatrics and general medicine, according to IF, when compared to dermatology journals. TC, AC, and usage count since 2013 were higher in the dermatology journals compared top pediatrics and general medicine journals, indicating fewer citations and lower visibility of pediatric journal

publications on AD. Additionally, AD articles from the non-refined pediatric category had fewer citations and visibility compared to articles from the top five dermatology journals.

Academic activity has been linked to a higher confidence of a clinician regarding practice, patient management, and conferring information to a patient. In addition, it aids in increase involvement and support in the patient's evidence-based decision-making.<sup>13</sup> Thus, the underrepresentation of AD in pediatric academia may impact the patient and clinician's level of understanding of the latest information regarding the disease. Subsequently, this may affect the coping level and process of clinical decision-making by the patient. Publications regarding pediatric AD patients are crucial in educating primary care physicians (PCPs) and pediatricians and keeping them up to date on the latest treatment recommendations. Previous studies have shown discrepancies between AD treatment prescribed by dermatologists and pediatricians. Two studies have shown dermatologists prescribed significantly higher potency and systemic corticosteroids compared to pediatricians who prescribed up to moderate potency and topical corticosteroids.<sup>14,15</sup> Moreover, dermatologists had a higher tendency to prescribe oral antibiotics, culturing, and more intensive therapy compared to pediatricians, who feared for safety and were ignorant of the role of treatment modalities in children.<sup>15</sup> Knowledge gaps can affect the management of AD by PCPs, as recent work on the education of pediatricians showed better coping and handling of AD after an intervention of online modules and the inclusion of algorithms for the management of AD.<sup>16,17</sup>

Novel treatment guidelines for AD are published earlier in top dermatology journals, compared to top general and pediatric journals, thus representing a lag in studies conducted by pediatricians regarding new medications in the field of dermatology. First, dupilumab, a biological drug that acts as an Interleukin 4 and 13 signaling inhibitor, was introduced to the general community via a randomized controlled trial in the *New England Journal of Medicine* in 2014<sup>18</sup> (Table S1). In later years, the drug was mentioned in the *JAAD* in an epidemiological study from 2016 (Table S2), whereas in the pediatric community, dupilumab was initially published in the top journals only in 2021. (Table S3) Second, tofacitinib, a JAK inhibitor, was mentioned for the first time in the treatment of AD in a case series in the dermatology field top journals in 2015<sup>19</sup> (Table S2). Subsequently the drug was published for the first time in the general medicine field top journals in 2020 (Table S1), with no mention of it in top pediatric related journals (Table S3). The time gap of novel treatment publications between adult and pediatric journals points to another avenue of underrepresentation of AD research in pediatrics.

One possible explanation for the underrepresentation of AD in pediatric academia, might be limited availability in primary care education. This was illustrated by a panel of expert pediatric dermatologists, pediatricians, and general practitioners on the curriculum of pediatric residents

regarding skin conditions. Eighty percent of this panel, that was assembled due to limited pediatric dermatology education for primary care and pediatric residents, had a consensus on updated objectives in the curriculum of primary care providers in the management of AD.<sup>20</sup> Another possible reason for poor academic representation of pediatric AD might be inadequate residency training regarding AD. Low emphasis on AD in training is shown in several studies, where qualified pediatricians state that eczema held low priority in primary care practice and in postgraduate and undergraduate education, resulting in gaps in knowledge and practice. Furthermore, a feeling of uncertainty among pediatric general practitioners in managing AD was reported.<sup>21</sup>

Another likely cause for the low number of high-impact pediatric AD publications could be the confidence level of pediatricians in managing AD and haste for referral to a dermatologist, separating it from their scope of care. In two recent surveys regarding pediatricians' confidence level in managing dermatological conditions, pediatricians were asked about their approach towards skin disorders in general and AD in specific. Average or low efficacy in diagnosis and management of skin disorders and AD specifically was stated amongst 77.8% of respondents<sup>22</sup> and in two-thirds of the respondents<sup>23</sup>, respectively. When asked regarding educational interventions, most of the survey participants stated that dermatology rotations and dermatology lectures should be included in the residency curriculum and showed that pediatricians who experienced them had a high level of confidence in managing AD.<sup>23</sup>

The low representation of AD publications in the top pediatric academia, as found in our study, could have several possible implications. First, the clinician's level of care, conferring of information, and involvement of patients in evidence-based decisions may be negatively affected. Second, damage to the level of care may affect the expenditure on AD, as seen in Europe on moderate to severe cases of AD, which accumulates to an annual societal cost of 30 billion euros. This expenditure, is divided to €15.2 billion related to missed workdays or reduced work productivity, €10.1 billion related to direct medical costs and €4.7 billion related to personal expenditure of patients/families.<sup>24</sup> In the United states of America, the cost of AD reaches to 5.297 billion USD, annually<sup>25</sup>. Costs are high as well as in non-industrialized regions which suffer a great economic burden due to AD.<sup>2</sup> Moreover, poor level of care may adversely affect the severity of AD and damage the daily life of a patient<sup>26</sup>, family life<sup>27</sup>, and parents' sleep quality.<sup>28</sup> This analysis is the first to our knowledge to perform a comparison of AD publications in different journal categories. Furthermore, by analyzing the top 100 most cited publications of each category in the five highest impact factor journals, we achieve a picture of the highest impact AD publications in each category. Our analysis of the highest impact pediatric publications, alongside the non-refined pediatric category, shows a micro and macro

representation of AD-related pediatric publications in ratio to the highest impact dermatology and general medicine AD-related academia.

However, we must note some limitations. First, our citation analysis didn't exclude the influence of self-citation, indicating that citation ranking does not always measure quality but rather attention to a specific topic and degree of recognition. Second, as Garfield E. et al. explain, the chance of being cited grows as a publication ages, and even those with the most citations have no citations when just published.<sup>29</sup> We tried to counter this bias by ranking the articles according to AC.

Given that the majority of AD cases are in the pediatric field<sup>2</sup>, our analysis highlights the gap in the literature and the necessity for more AD-focused publications in pediatric journals and high IF journals specifically. Because pediatricians and PCPs will inevitably meet AD patients, an underrepresentation in literature may affect the clinicians and patients' level of care and evidence-based decision making.

### ***Abbreviation list***

AD – Atopic dermatitis

AC – Annual citation

TC– Total citation

R – Effect size

JAAD – Journal of the American Academy of Dermatology

IF – Impact factor

GADA - Global atopic dermatitis atlas

Webos – Web of science

BA- Bibliometric analysis

PCP- Primary care physician

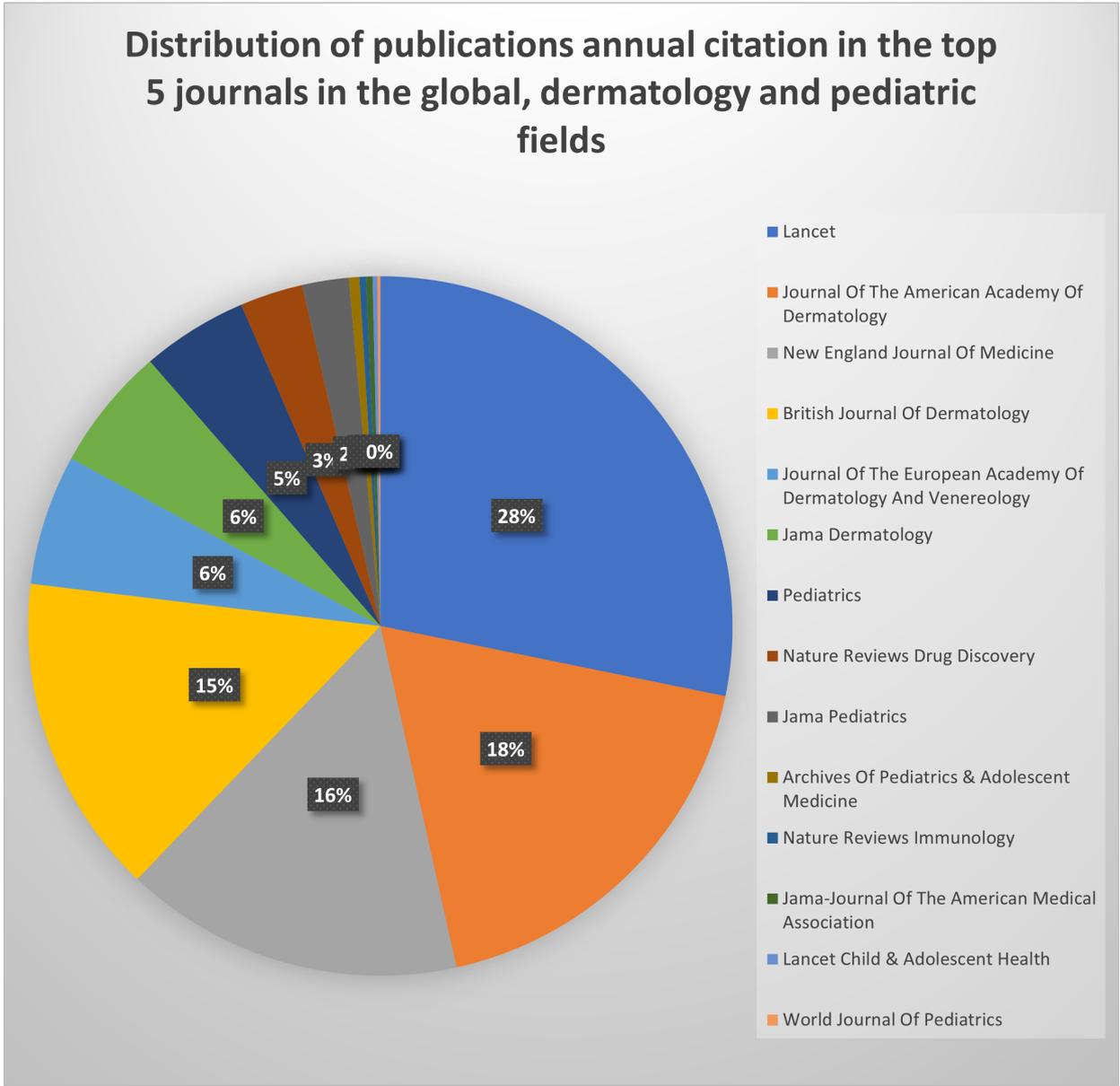
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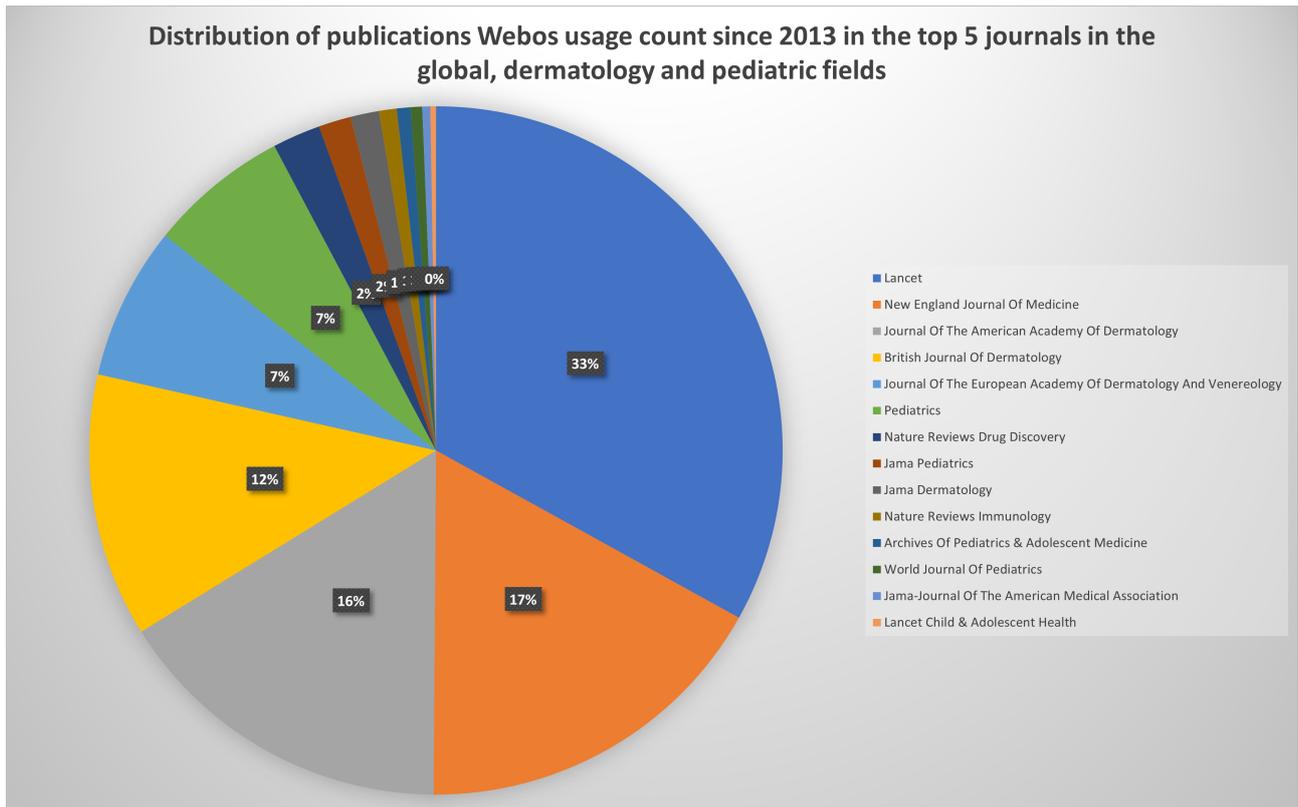
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**Figure 1. Distribution of the top publication's annual citation in the top 5 journals in the general, dermatology and pediatric fields.**



**Figure 2. Distribution of Webos usage count since 2013 in the top publications in the top 5 journals in the general, dermatology and pediatric fields.**