

## ASPECTOS NEUROPSICOLÓGICOS E SOCIOEMOCIONAIS EM CRIANÇAS COM DERMATITE ATÓPICA

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**RESUMO:** A dermatite atópica (DA) é uma doença de etiologia multifatorial que causa inflamação da pele e leva ao aparecimento de lesões e à coceira. O objetivo deste estudo foi investigar os aspectos neuropsicológicos e socioemocionais em crianças com DA e seus pais. Realizou-se revisão da literatura nas bases de dados SciELO, PubMed e LILACS, incluindo artigos publicados a partir de 2001 em português e inglês. Foram selecionados 23 artigos, sendo 13 referentes à relação entre DA e aspectos neuropsicológicos e socioemocionais das crianças e 10 relativos ao impacto da doença nos pais. Constatou-se que a DA influencia negativamente a qualidade de vida e a qualidade do sono da criança, bem como está relacionada a sintomas de ansiedade e a outros distúrbios psicológicos. Observaram-se efeitos positivos em todos os programas de educação parental. Entende-se que os aspectos psicofisiológicos tanto das crianças quanto dos seus pais necessitam ser considerados nos tratamentos.

*Palavras-chave:* aspectos neuropsicológicos, aspectos socioemocionais, dermatite atópica, eczema, crianças

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## NEUROPSYCHOLOGICAL AND SOCIOEMOTIONAL ASPECTS IN CHILDREN WITH ATOPIC DERMATITIS

**ABSTRACT:** Atopic dermatitis (AD) is a multifactorial disease that causes inflammation of the skin and leads to the appearance of lesions and itching. The aim of this study was to investigate the neuropsychological and socioemotional development of children with AD and their parents. A literature review was conducted using the SciELO, PubMed and LILACS databases, including articles in English and Portuguese published since 2001. We selected 23 articles: 13 on the relationship between AD and the children's psychophysiological and socioemotional factors, 10 on the disease's impact on their parents. It was found that AD has a negative influence on the child's quality of life and sleep quality and is related to symptoms of anxiety and other psychological disorders. The studies found positive effects from all parental education programs. It was found that the psychophysiological aspects presented by both children and their parents need to be considered during treatment.

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*Keywords:* neuropsychological aspects, socioemotional aspects, atopic dermatitis, eczema, children

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Recebido em 17 de Junho de 2018/ Aceite em 05 de Março de 2019

Atopic dermatitis (AD), also known as atopic eczema, is a disease that causes skin inflammation, leading to the onset of lesions and itching. It is an inflammatory, chronic, recurring dermatosis with a multifactorial etiology. The disease predominantly affects children and can start as late as the age of five, but almost always develops during the first year of life (Catal et al., 2016).

Among the factors that can trigger the disease, those that most stand out include: genetic predisposition, increased skin irritation, aeroallergens, altered muscular reactivity, increased perspiration, pollution, and intense itching (Williams, 2005). According to the Association for Atopic Dermatitis Support (AADA, 2014), AD generally affects individuals with a personal or family history of asthma, allergic rhinitis, or AD; these three diseases are known as the "atopic diseases" or the "atopic triad." Also according to the AADA (2014), children who have one parent with an atopic condition have an approximately 25% chance of also developing some form of atopic disease, whereas children who have two parents with an atopic condition have a more than 50% chance of also developing an atopic disease.

The symptoms of AD are skin changes, such as pruritus (itching), eczematous lesions, inflammation, and redness. According to the AADA (2014), during early childhood, skin lesions are more likely to be reddish and located on the face, torso, and outer limbs. In older children and adults, the lesions are more likely to be located in folds in the body, such as at the neck, the folds of the elbow and the creases behind the knees, and to be drier, darker, and thicker.

The disease has an early onset, usually before age 1. However, with early diagnosis, lesions can be reduced by approximately 60% or even clear up completely before puberty.

Since this is a chronic condition with unknown causes, the primary goal of treatment is to control the disease with topical medication such as creams and ointments, to improve symptoms and prevent them from worsening or recurring. Systemic drugs, such as corticosteroids, are only used in more serious cases.

AD has a biological dimension with specific physiological characteristics, which are addressed by treating identifiable phenomena in the body. It also has a social/psychological dimension, which is addressed by constructing a system that represents the disease and helps the patient take control. This is because the disease arises from a symbolic network of meanings shaped by cultural aspects.

Different anatomical changes have been found in AD patients' skin, such as increased transepidermal water loss, decreased production of sebum, and changes in the fatty acid content of sebum (Leicht & Haggi, 2001). However, the neurophysiological effects of AD on patients have not been well researched.

Yosipovitch and Papoiu (2015) found greater activation of the posterior cingulate cortex and precuneus (a cortical area linked to integrated functions such as visuospatial imagery, episodic memory retrieval, and self-awareness) in patients. This highlights the emotional and affective process of experiencing pruritus, in which the degree of neural activation correlates with the intensity of the pruritus and the severity of the disease. Mirror neurons in the frontal cortex are involved in the processing of the corticosteroid network and are activated when one individual sees another performing an action and does the same, imitating the other's behavior as if performing the other's action. These neurons are associated with exposure to itching, which triggers the act of scratching.

In the study by Papoiu, Wang, Coghill, Chan and Yosipovitch (2011), patients with AD and healthy individuals were shown videos of people scratching themselves in order to prompt itching with visual stimuli. Patients with AD scratched themselves more intensely and more times. Schut, Bosbach,

Gieler and Kupfert (2014) found that patients with AD were more likely than healthy individuals to scratch themselves when prompted with auditory and visual stimuli. According to Holle, Warne, Seth, Critchley and Ward (2012), people who were less emotionally stable scratched more intensely and were more likely to experience negative emotions such as fear, anger, disgust, and shame.

Psychodermatological disorders are changes that involve the interaction between the mind and the skin. They are subdivided into three types: psychophysiological, primary psychiatric, and secondary psychiatric. Azambuja (2005) classifies AD as psychophysiological. Psychodermatological patients have a wide range of profiles and emotional problems caused by skin diseases, including shame, a distorted body image, and low self-esteem.

Children with chronic diseases, such as AD, are more likely than healthy children to experience symptoms of depression, anxiety, and stress (Hon et al., 2015), and to display other behavioral problems. Patients with AD have been described in the literature as insecure, dependent, sensitive, and to have a tendency to repress their emotions, as well as difficulty expressing anger (Ferreira, Müller & Jorge, 2006).

Social factors related to their families are also very important, since in most cases it is the families who are responsible for providing care during treatment. Basra, Sue-Ho and Finlay (2007) found that AD has a generalized impact on families and that there are few support networks offered to caregivers. A family can be seen as a self-regulating system that defines what is or is not allowed. Often, the greatest difficulties caregivers face include dealing with the child's needs, paying for medication and keeping a balanced environment with other, healthy, children, in addition to fatigue, worry, and changes in sleep patterns.

This article aims to present a literature review of the neuropsychological and socioemotional aspects pertaining to AD with regard to children and their parents and/or caregivers.

## METHODOLOGY

A literature review was carried out through research conducted using the following expetsopen databases: SciELO (*Scientific Electronic Library Online*), PubMed, and LILACS (Latin American and Caribbean Health Sciences Literature). The search terms used include: *neuropsychological aspects atopic dermatitis, atopic dermatitis child, positive affect child, negative affect child, children social skills dermatitis, anxiety atopic dermatitis, depression atopic dermatitis, sleep atopic dermatitis, pain atopic dermatitis, stress atopic dermatitis*. These terms were searched for in English and three researchers looked over the abstracts, focusing on the categories related to the objective of the study, methods, results, and the conclusion. As a result, 43 articles were selected.

The next stage involved a comprehensive reading of the selected studies in order to include in the study articles published since 2001 that broached empirical studies dealing with atopic dermatitis, and which focused on children and mentioned neuropsychological and socioemotional aspects. The languages selected were Portuguese and English. Finally, after discarding literature reviews, systematic reviews, and studies not related to psychological aspects, in addition to duplicates found across the databases, 23 articles were ultimately selected.

## RESULTS

Based on the results of this review, the main categories can be highlighted, which include the objective, methods, and results of each study. The following table (Table 1) summarizes the studies that deal with the neuropsychological and socioemotional aspects of children with AD.

## PSICOLOGIA E DERMATITE ATÓPICA

**Table 1.**

Studies about neuropsychological and socioemotional aspects of children with atopic dermatitis

Author/Year	Objective	Methods	Results
Weber et al. (2012)	To assess the quality of life of pediatric dermatology patients in a center of excellence for dermatology.	Analytical cross-sectional study	The average Children's Dermatology Life Quality Index was 5.01 for patients with chronic cases and 2.07 for acute cases, indicating that quality of life is more significantly compromised among chronic patients.
Kim & In (2013)	To investigate the relationships between resilience and behavioral problems in school-age children with AD and its associated factors.	Analytical cross-sectional study	The higher each child's resilience score, the less likely the child was to internalize ( $\beta = -1.648$ , $p = 0.034$ ) and externalize ( $\beta = -1.382$ , $p = 0.041$ ) behavioral problems.
Yaghmaie et al. (2013)	To investigate the state of mental health associated with pediatric AD in the United States.	Case-control study	The probability of developing attention-deficit/hyperactivity disorder was significantly higher among children with AD compared to those of control individuals without AD.
Stein et al. (2012)	To present the treatment of a 7-year old girl with severe AD by using topical and systemic drugs against itching and refractory pain.	Case study	Diminished itching, scratching, pain, and anxiety were observed within the first month of treatment. Lesions and bleeding episodes dropped almost entirely by the fourth month.
Shani-Adir et al. (2009)	To assess a possible relationship between sensory hypersensitivity, sleep quality, and the severity of the AD.	Case-control study	The AD group showed significantly worse sleep quality compared to the control groups. Sensory hypersensitivity was correlated with lower sleep quality.
Kimata (2007)	To measure the level of salivary ghrelin during sleep among healthy children and children with AD who wake up during the night.	Case-control study	After watching funny movies, night wakings improved and the rise in salivary ghrelin levels was reduced among patients with AD compared to the control group.
Ohya et al. (2001)	To analyze the relationship between psychosocial factors and adherence to treatment among children with AD.	Longitudinal study	The strongest predictor of adherence to treatment was a good doctor-patient relationship with the child's mother – which also reinforces the mother's self-efficacy –, followed by the mother's perception of the severity of the disease.
Yang et al. (2010)	To assess the correlation between subjective symptoms, intensity, and	Analytical cross-sectional	There is a significant correlation between subjective symptoms, intensity, and distribution of the

	distribution of the disease in Korean children with AD.	study	disease in Korean children with AD.
Camfferman et al. (2010)	To investigate the association between sleep disorders and neurocognitive and behavioral deficits in children with AD compared to healthy children.	Case-control study	Children with eczema showed more sleep disorders and a stronger association with neurocognitive and behavioral deficits than did healthy children.
Afsar et al. (2010)	To investigate levels of basal serum cortisol and anxiety in pediatric patients with AD and healthy children.	Case-control study	Children with AD are not more anxious and do not have higher cortisol levels than children in the control group, but the severity of the disease may cause higher levels of anxiety among children with AD.
Catal et al. (2016)	To compare the frequency of psychiatric disorders and severity of symptoms in children aged 3-5 and attending early childhood education with atopic eczema, compared to a control group.	Case-control study	Psychiatric disorders and their symptoms are more frequent in children attending early childhood education with atopic eczema compared to the healthy control group.
Nanda et al. (2016)	To examine the association between various allergic diseases in early childhood, using validation measures for internalizing diseases during school age.	Longitudinal study	Children aged 4 with allergic rhinitis and loud breathing are at a higher risk of developing internalizing behavior at age 7. Furthermore, various allergic diseases, such as AD, are associated with higher internalization scores.
Hon et al. (2015)	To investigate the prevalence of depressive symptoms, anxiety, and stress, as well as the association between the severity of the disease, quality of life, and skin biophysiology during early childhood in children with AD.	Analytical cross-sectional study	A compromised quality of life is correlated with severity of the disease, skin biophysiology, and symptoms of depression, anxiety, and stress in adolescents with atopic eczema.

## PSICOLOGIA E DERMATITE ATÓPICA

Some of the studies found also dealt with the impact of the disease on the parents and/or caregivers of children with AD. These studies are related on Table 2.

**Table 2.**

Studies relating to the impact of the disease on the parents and/or guardians of children with atopic dermatitis

<b>Author/Year</b>	<b>Objective</b>	<b>Methods</b>	<b>Results</b>
Pustisek et al. (2016)	To assess the effects of a structured short-term educational program on parents of children with moderate to serious AD on parental stress and anxiety and the family's quality of life.	Experimental study	The educational program had a positive effect on serious AD, the family's quality of life, and parental stress and anxiety.
Futamura et al (2013)	To assess the long-term effects of a 2-day parental education program on mothers of Japanese children aged 6 months to 6 years with AD.	Experimental study	The program had positive long-term effects on severity of eczema and parental anxiety about the use of corticosteroids.
Ricci et al. (2009)	To promote quality of life for parents of children with AD by means of an educational program.	Experimental study	The intervention was effective at improving quality of life and decreasing anxiety among parents of children with AD.
Kojima et al. (2013)	To investigate factors predicting fear of steroids in caregivers (generally mothers) of children with AD.	Analytical cross-sectional study	Characteristics of the female patients, parental history of the child with AD, and frequent changes in clinics were factors predicting a fear of steroids. Severity of the disease was not correlated to fear of steroids.
Smith et al. (2010)	To investigate the association between anxiety and corticosteroid treatment and a preference for natural therapy among parents of children with AD.	Qualitative study	Anxiety was associated with corticosteroid treatment. Parents of children with AD presented a negative perception of, and difficulty in, accepting this medication.
Moore et al. (2006)	To compare the impact on the sleep and well-being of parents who care for a child with atopic eczema compared to asthma.	Case-control study	Compared to caring for a child with chronic asthma, caring for a child with chronic atopic eczema was associated with more sleep disorders among parents.
Dennis et al. (2006)	To investigate the relationship between children, parents, and familial factors when promoting a positive adjustment to atopic eczema.	Analytical cross-sectional study	Parents with sound mental health, a supportive family environment, and one whose functioning was not significantly impacted by atopic eczema were predictors for low levels of internalizing behaviors (anxiety, depression, and social isolation).

Sarkar et al. (2004)	To investigate psychological disorders in Indian children with AD compared to healthy children, and elevated levels of emotional stress among their mothers compared to the control group.	Case-control study	An increase in psychological disorders was seen in Indian children with AD compared to the control group. Most mothers of children with AD displayed submission, which can contribute to psychological disorders and the persistence of eczema in children.
Ferreira et al. (2006)	To qualitatively investigate the experiences of three families regarding AD and elements of the family dynamics when one of the children has this disease.	Qualitative study	The families reported that AD led to important social and psychological problems and that the family dynamics influence and are influenced by the frequency and intensity of symptoms as well as by the rise in stress, and that the disease interferes with family communication and relationships between family members.
Holm et al. (2006)	To examine the influence of the parents' genders and psychological factors that affect the quality of life of children with AD.	Analytical cross-sectional study	No significant difference between genders was found regarding severity of the disease among children.

Based on the information on Tables 1 and 2, the results are discussed below.

## DISCUSSION

The studies found were conducted with participants from Brazil, South Korea, the United States, India, Italy and Japan. The prevalence of atopic dermatitis (AD) varies around the world: in the United States and Europe, 15% to 20% of children are affected (Castro, 2012); in Brazil, prevalence is lower, ranging from 8.9% to 11.5%, according to Castro et al (2006). The children involved in the studies ranged from infancy to age 6, the period when the majority of AD cases manifest (Castro, 2012).

Among the types of studies included, 8 were case-control, 7 cross-sectional, 3 experimental, 2 qualitative, 2 longitudinal, and 1 was a case study. It was very rare to see a study about interventions involving parents and children with AD. It stood out that most studies aimed to understand the psychological mechanisms related to the disease.

Of all the studies, 13 covered neurophysiological and socioemotional factors of children with AD, which are described on Table 1. Among the neuropsychological aspects related to the disease, the studies highlighted ADHD, or attention-deficit hyperactivity disorder (Yaghmaie, Koudelka & Simpson, 2013), sleep quality (Shani-Adir, Rozenman, Kessel & Engel-Yeger, 2009), and neurocognitive deficits (Camfferman, Kennedy, Gold, Martin & Lushington, 2010). Meanwhile, socioemotional aspects included psychiatric disorders (Catal et al, 2016) and symptoms of anxiety, depression and stress (Hon et al, 2015). These indicators negatively affected the degree of severity of the disease in children with AD.

## PSICOLOGIA E DERMATITE ATÓPICA

Conversely, among these 13 studies, a number of socioemotional factors that have a positive impact on the condition of children with AD were also found. The study by Kim and In (2013) highlighted that the more resilient the children with AD were, the lower their chance of internalizing and externalizing behavioral problems. The American Psychological Association Dictionary (2010) defines resilience as "the process and result of adapting well to difficult or challenging life experiences, especially by being mentally, emotionally and behaviorally flexible..." (p. 809). We can therefore confirm that resilience is an important protective factor for these patients.

According to Kimata (2007), after the children watched comedic films, there were improvements to night waking and to heightened ghrelin levels in saliva in children with AD compared to the control group. Children with AD can be significantly affected by changes in sleep quality and quantity, which lead to fatigue and difficulty concentrating and learning, and may result in poor school performance (Alvarenga & Caldeira, 2009). Another study (Ohya *et al.*, 2001) analyzed the relationship between psychosocial factors and adherence to treatment among children with AD. The best predictors for successful treatment were a good doctor-patient relationship with the child's mother and how severe the mother perceived the disease to be. Regarding the doctor-patient relationship, Búrigo (2011) says:

The actual patient is the child. However, the person who keeps the doctor informed, who describes the child's current and past symptoms, and who adheres to the doctor's instructions and prescriptions is the mother. Therefore, her involvement is so important [...] that, in general, she herself is almost the patient. Therefore the doctor has a singular task to perform, that is, to communicate with two patients simultaneously: the dependent child and his or her mother or guardian(s). (p. 65).

Afsar, Isleten and Sonmez (2010) found that children with AD did not display more anxiety than the control group; however, it was found that their level of anxiety may be influenced by the severity of the condition. The study by Nanda *et al.* (2016) examined the association between allergic diseases in early childhood and internalizing behaviors during school age, and found that children with allergic rhinitis at age 4 had a higher chance of developing internalizing behaviors by age 7. This corroborates Castro *et al.* (2006), who states that 40% of children with AD develop respiratory diseases from ages 3 to 6. Allergic diseases such as AD are associated with scores on the internalizing behavior checklist (Nanda *et al.*, 2016). Yang, Jeon and Pyun (2010) found that there is a significant correlation between pruritus symptoms and sleep disturbances and the intensity and distribution of the disease in Korean children with AD. A case study by Stein, Sonty and Saroyan (2012) found that there was a decrease in physiological aspects and anxiety when the patient (age 7) was treated with medication that relieved itchiness and refractory pain.

The results of the studies described on Table 1 reveal in large part that there is a relationship between AD and neurophysiological and socioemotional aspects among children, whether the resulting influence is a negative (anxiety and stress) or positive (resilience) one. This finding is in agreement with authors and studies that recognize a relationship between the mind and body, such as Azambuja (2005), who classifies AD as a psychophysiological disorder.

From this point forward, the studies described on Table 2 will be addressed, which deal with the impact of the disease on the parents and/or caregivers of children with AD, as well as its impact on treatment. Parents participated in 10 of the studies. During 4 of these studies, the parents were accompanied by their children who had AD. We found a few rare examples of studies about interventions for parents and/or caregivers of children with AD: only 3 parent education programs in total, conducted in Asia (Futamura, Masuko, Hayashi, Ohya & Ito, 2013) or Europe (Pustisek *et al.*, 2016; Ricci, Bendandi, Aiazzi, Patrizi & Mais, 2009).

Of note were the positive results found by the study conducted by Ricci *et al.* (2009), which looked at a parent education program in Italy that involved 6 meetings with an interdisciplinary team composed of a pediatric allergist, dermatologist and psychologist. This type of program helped improve the quality of life of the families with children affected by AD and, in conjunction with conventional

treatment, may be useful in the long term for managing the disease. The program had a positive influence on quality of life and reduced anxiety among parents of children with AD. The study organized a 2-day program for mothers of children (aged 6 months to 6 years) with AD and evaluated its long-term effects on the mothers. The program resulted in lower anxiety among parents over using corticosteroids to treat their children's dermatological conditions.

As for the topics discussed within the programs, in addition to Ricci et al. (2009), Pustisek et al. (2016) and Futamura et al. (2013) also discussed parental anxiety, which was reduced after the interventions by the programs. Some studies involved only parents of children with AD as participants. The topics investigated included predictive factors of the fear of steroids (Kojima et al., 2013), the association between anxiety and corticosteroid treatment (Smith, Hong, Fearn, Blaszczyński & Fischer, 2010), and the impact of dedicated care on the parents' sleep and well-being (Moore, David, Murray, Child & Arkwright, 2006).

According to Dennis, Rostill, Reed and Gill (2006), parents with sound mental health, a supportive family environment, and one in which atopic eczema had a low impact were predictors for low levels of internalizing behaviors, such as anxiety, depression, and social isolation. Another study, conducted by Sarkar et al. (2004) and involving children in India, found that psychological disorders were more common in children with AD than the children in the control group and that children with AD have a higher probability of their mothers developing psychological disorders, which may be due to the traditionally submissive role they tend to play in their cultural context.

In a study by Ferreira et al. (2006), families reported that AD had a negative impact on the household environment. In another study, Holm, Esmann and Jemec (2006) demonstrated that the gender of the parents and/or caregivers does not significantly affect the seriousness of their children's disease. We found few studies investigating educational programs directed toward parents and/or caregivers. These programs had a positive effect, especially with regard to parents' anxiety. Nonetheless, due to the scarcity of studies on this topic, it would not be prudent to generalize and assert that these interventions are beneficial. This being the case, we should note that Zazula et al. (2011) also found few programs during their review and considered their effectiveness inconclusive.

Environments in which children and their parents receive support were found to be important to preventing children suffering with AD from internalizing emotional disorders, which makes it a protective factor. On the other hand, the family environment was also found to be susceptible to the adversities provoked by AD and subject to a negative impact by them.

The results of this study contributed to the understanding of the neuropsychological and socioemotional aspects of children with atopic dermatitis (AD) and their families. With regard to studies about these aspects in children with AD, it was found that the disease has a negative influence on the child's quality of life and sleep quality and that it correlates with and can provoke symptoms of anxiety and other psychological disorders. Similarly, the disease can in turn also be affected by these factors, and as such can manifest less or more severely depending on the patient's emotional support and structure.

In the studies involving parents and/or caregivers of children suffering from AD, it was observed that there were positive effects from the parental education programs encountered; however, a scarcity of such interventions found in the literature is a negative point that stood out. Because of the small number of studies on this topic, the importance of future studies examining their effectiveness should be emphasized. However, they do seem to be important adjuvants when treating the disease, since they provide support to the family environment.

Based on the results of the studies found in this systematic review, we understand that neuropsychological and socioemotional aspects of both the children suffering from AD and their parents and/or caregivers need to be considered and appreciated during treatment. From a biopsychosocial perspective, mind and body can be found once again to be interconnected. Therefore, when treating diseases, one cannot be neglected at the detriment of the other.

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