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Original Article

Assessment of Association between Atopic Dermatitis and Attention Deficit Hyperactivity Disorder

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ABSTRACT

Background: *The face (cheeks), neck, arms, and legs are the main body parts affected by atopic dermatitis, however the groin and axillary areas are frequently spared. Finding out how often attention deficit hyperactivity disorder is in kids with atopic dermatitis is the goal.* ***Materials and Methods:*** *The 116 children and adolescents (ages 4 to 18) with confirmed cases of atopic dermatitis were chosen for the research based on the inclusion and exclusion criteria. According to the 2014 American Academy of Dermatology Guidelines, atopic dermatitis was found. The Conner Rating Scale served as the foundation for the diagnosis of attention deficit hyperactivity disorder. The Pittsburg Sleep Quality Questionnaire was used to evaluate the sleep issue.* ***Results:*** *Our Atopic dermatitis patients had hyperactivity and attention deficit problems at rates of 20.68% and 32.75%, respectively. The prevalence of hyperactivity condition was also considerably greater in individuals who had sleep issues. The study's findings indicated that hyperactivity was primarily responsible for the flexors' involvement. This study also shown a link between the involvement of the cheeks in atopic dermatitis patients, attention deficit, and sleep issues.*

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Conclusion: *children who also have certain comorbid conditions including allergic rhinitis, allergic conjunctivitis, and asthma, particularly those brought on by atopic dermatitis, are more likely to develop hyperactivity and attention deficit disorder in later childhood. Sleep deprivation in kids with atopic dermatitis has been demonstrated to be one of the key causes, particularly for attention deficit.*

Key-words: *Atopic dermatitis, Attention-deficit hyperactivity disorder, sleep disorder.*

INTRODUCTION

Atopic dermatitis (AD) is the most prevalent inflammatory skin condition with an onset in childhood, with an estimated incidence of 1% to 2% in adults [1,2,3]. The total frequency ranges from 8% to 11%. Common in underdeveloped countries, it is associated with intense itching and trouble sleeping. Potential negative repercussions of these symptoms include distraction and difficulties with focus and attention. The attention deficit hyperactivity disorder (ADHD) affects between 5 and 8 percent of children worldwide, making it the most common kind of childhood behavioral disorder [7,8]. The prevalence of mental health problems such sadness, anxiety, and stress has been found to be much higher in AD patients. Most people with AD had a milder form of the illness, but the combination of AD with other chronic medical conditions can be debilitating [4].Many studies and a comprehensive review have found a correlation between atopic dermatitis and ADD/ADHD in youngsters [10,11]. Adult atopic dermatitis and attention deficit hyperactivity disorder are still being studied. However, it is yet to be determined what variables contribute to the link between atopic dermatitis and ADD/ADHD. An interrupted night's sleep has been associated to an increased risk of developing atopic dermatitis in two studies [4, 5, 6]. Children with atopic dermatitis have an increased risk of developing ADHD, which may be due to the increased prevalence of comorbidities such as obesity, anemia, headaches, asthma, and allergic rhinitis. The link between atopic dermatitis and ADD/ADHD goes deeper than that, and there are other factors that may increase one's susceptibility to developing the skin condition. Patients with attention deficit hyperactivity disorder (ADHD) and their families face a wide range of challenges as a result of the disorder's hallmark symptoms, including inattention, hyperactivity, and impulsivity, including difficulties in the classroom, trouble sleeping, social isolation, and a general decline in quality of life [9]. Several studies conducted throughout the course of the last century examined the possible link between atopic dermatitis and ADD/ADHD. The current study set out to answer the questions, "How common is ADHD?" and "Is it possible that atopic dermatitis might be a predictor of ADHD?" among children with both conditions.

MATERIALS AND METHODS

This cross-sectional study was done between May 1 and October 30, 2017, by the Department of Dermatology & Venereology at the Combined Military Hospital (CMH) Bogura. 116 children and adolescents (aged 4-18) with confirmed cases of atopic dermatitis made up the research population. Since it may be difficult to get a firm diagnosis of ADD in very young children, we decided to omit them from the research. Mental retardation,

a history of brain injury or intracranial infection, and inability to understand the exam or to participate in the interview were further disqualifying factors. During interviews and at the time of clinic admission, information on the patients' or their family members' atopy histories was collected. After that, a dermatological exam and a full physical were conducted on everyone. The 2014 American Academy of Dermatology (AAD) Guidelines were used in the assessment of atopic dermatitis symptoms and signs.

Those symptoms of ADD/ADHD were initially identified using the Conner Rating Scale. This assessment is designed to identify ADD/ADHD and the most common co-occurring disorders in children and adolescents between the ages of 4 and 18. The total number of items on this test was 27, divided among four scales (oppositional problems, cognitive issues, hyperactivity, and an ADHD index). The ADHD index was rated on a 4-point scale where a score of 0 meant "not at all," 1 meant "just a little," 2 meant "pretty much," and 3 meant "very much."

The Pittsburg Sleep Quality Index (PSQI) was also utilized to evaluate the extent of the aforementioned sleep disruption. This survey consisted of 19 items for the respondent to rate themselves on and 5 for their sleeping partner to finish. Seven "component" ratings were generated from the self-reported 19 criteria, with each rating spanning from 0 (very easy) to 3 (very difficult). The seven subscores were added together to form an overall score that ranged from 0 (very easy) to 21 (very tough).

Statistical analysis:

The information was analyzed using SPSS 12, a statistical program designed for social science research. The computer was used for data entry, editing, and coding. Both the p value threshold and the associated confidence interval were established at 95%. The findings were presented in both text and tables.

RESULTS

Out of 1674 individuals, 116 confirmed instances of atopic dermatitis were chosen in accordance with the 2014 American Academy of Dermatology (AAD) Guidelines. Because of this, 6.9% of the young children in our observation experienced dermatitis unique to atopic dermatitis (**Table I, Figure 1**.

Table-I: Prevalence of Atopic dermatitis (n-1674)

Total number of patients	Dermatoses not specific to Atopic dermatitis	Dermatoses specific to Atopic dermatitis
1674	1558(93.10%)	116(6.9%)

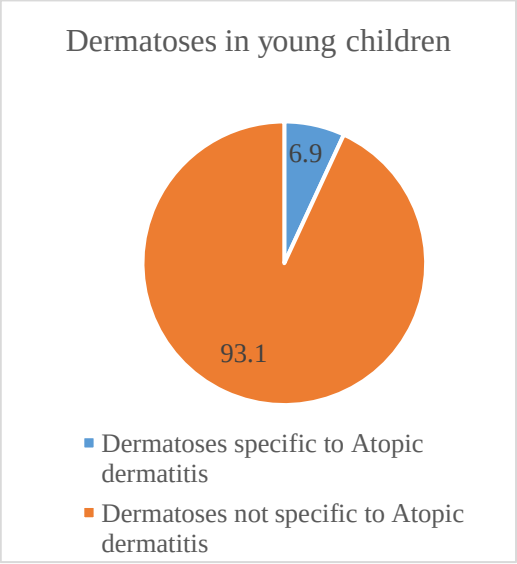

Fig-1: Prevalence of dermatoses in young children (n-1674)

Table II: Distribution of Atopic dermatitis by age

Age group	No of patients	Percentage
04-07 yrs	21	18.10%
08-11 yrs	44	37.90%
12-15 yrs	36	31.03%
16-18 yrs	15	12.90%
Total	116	

Table II reveals that the majority, 44 (37.03%), were between the ages of 8 and 11, with another 36 (31.03%) between the ages of 12 and 15. Patients aged four to seven accounted for 21 (18.10%). Fifteen (12.90%) were in the 16-18 age range (**Figure 2**).

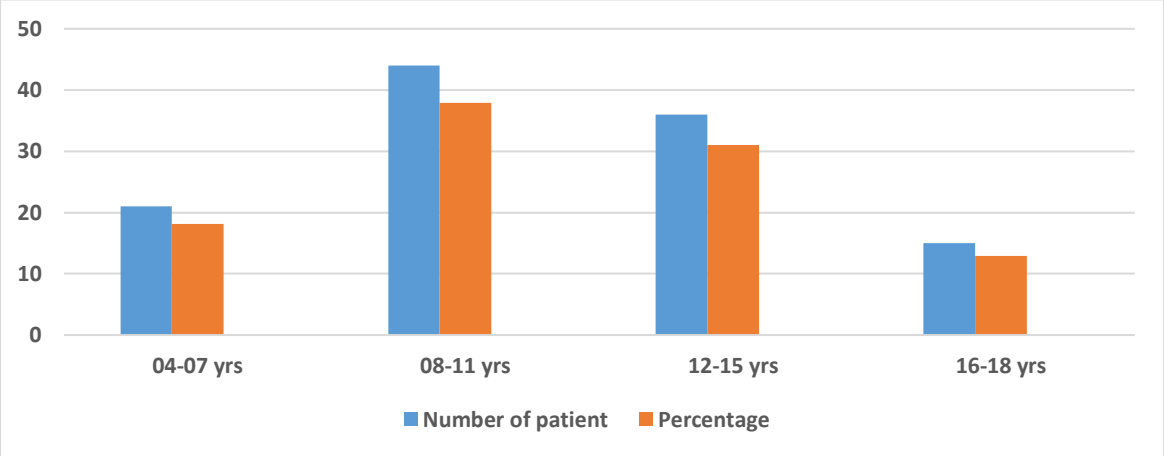

Fig-2: Distribution of Atopic dermatitis by age

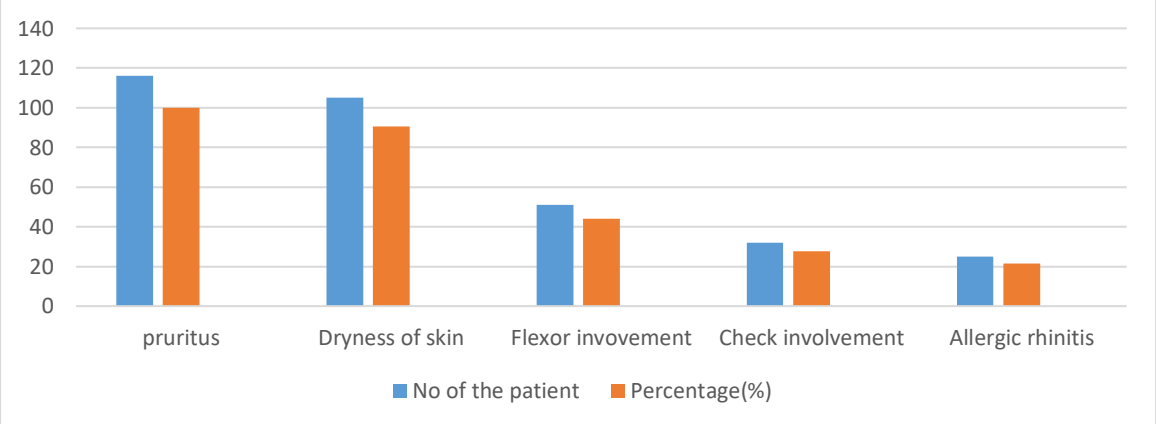

Fig-3: shows that pruritus and dryness of skin was the most common symptoms in Atopic Dermatitis

With a median age of 9, the 116 people with a confirmed diagnosis of AD varied in age from 4 to 18 years. These patients were evenly divided between 59 (50.86%) women and 57 (49.13%) males. A total of 82 AD individuals (or 70.68%) had a family

history of the disease. The two most prevalent symptoms of AD were scratching and dry skin (100 percent and 90.63%, respectively (**Figure 3**). According to this study, asthma affected 8 patients (6.79%), cheek involvement affected 32 patients (27.58%), flexor involvement affected 51 patients (43.96%), and allergic rhinitis affected 25 patients (21.55%). In addition, 41 persons (35.34%) mentioned having trouble sleeping. 33 (28.44%) of the AD patients showed signs of the illness, and 24 (20.68%) of the AD patients matched the criteria for the diagnosis of ADHD.

A study found that individuals with AD who had flexor involvement had a 5.33 times higher chance of developing hyperactivity condition. Additionally, hyperactivity disorders were significantly more likely to develop in people with sleep problems. However, no other atopy traits were found to be substantially associated with hyperactivity. This study also found a connection between sleep problems, cheek involvement, and attention deficit disorder.

Table III: Distribution of the study population by different characteristics associated with hyperactivity or without hyperactivity (n=116)

Criteria	Patients with hyperactivity (n=29), n (%)	Patients without hyperactivity (n=87), n (%)	P
Male gender	19 (65.51)	35 (44.74)	0.07
Age(year) Median	10	9	0.52
IQR	5-12	6.25-13.75	
Range	4-18	4-18	

Out of 116 patients of Atopic Dermatitis, 24 (20.68%) patients had hyperactivity disorder and 92 (79.31%) patients were without hyperactivity disorder (**Table III, Figure 4,5**).

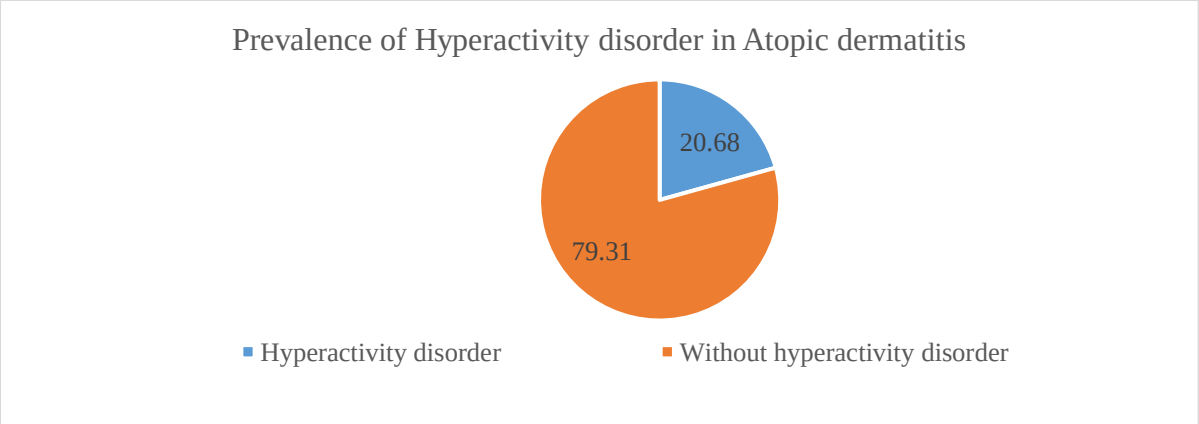

Fig-4 Prevalence of Hyperactivity disorder in Atopic dermatitis

Table IV: Distribution of the study population Associated with Hyperactivity disorder by different Clinical presentation (n=116)

Criteria	Patients with hyperactivity (n-24)	Patients without hyperactivity (n-92)
Dry skin	22 (91.66)	81 (88.04)
Flexor involvement	21 (87.50)	47 (51.08)
Cheek involvement	12(50.00)	37 (40.21)
Family history	18 (75.00)	68 (73.91)
Sleep problem	13 (54.16)	33 (35.86)
Allergic rhinitis	09 (37.50)	21 (22.82)
Asthma	06 (25.00)	07 (7.60)

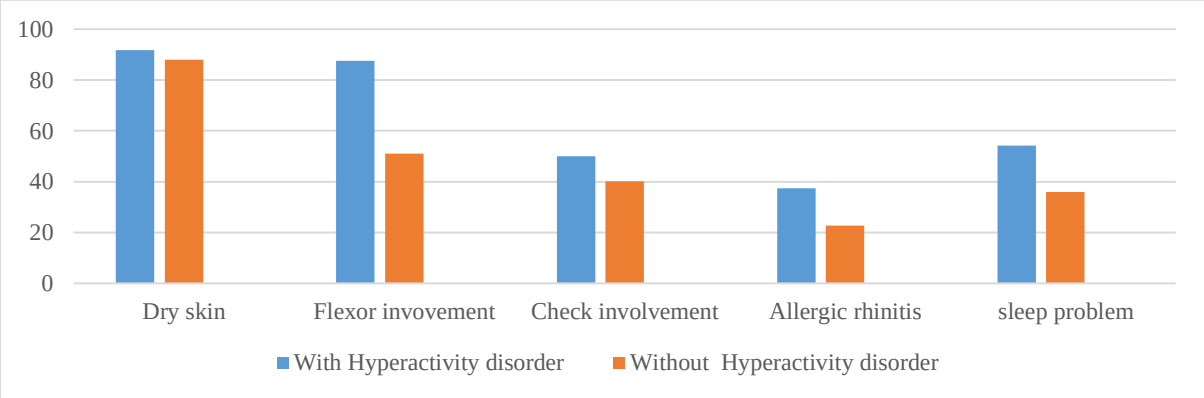

Fig 5: Association of Hyperactivity disorder in different clinical presentation of Atopic Dermatitis

Table V: Distribution of the study population by different clinical presentation associated with attention deficit or without attention deficit (n=116)

Criteria	Patients with attention deficit	Patients without attention deficit	P
	(n=38), n (%)	(n=78), n (%)	
Male gender	24 (63.16)	38 (48.71)	0.16
Age(year) Median	10	9	0.60
IQR	8-12	6-13	
Range	4-18	4-18	

Out of 116 patients of Atopic Dermatitis, 38 (32.75%) patients had attention deficit and 78(67.24%) patients were without attention deficit (**Table V, Figure 6).**

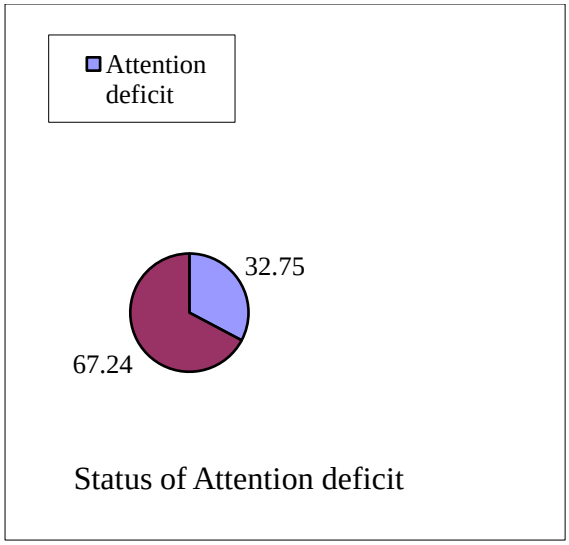

Fig 6: Status of Attention deficit in Atopic Dermatitis

DISCUSSION

116 participants were included in our study since they fulfilled both the inclusion and the exclusion criteria. There were 44 instances of atopic dermatitis in children and adolescents between the ages of 8 and 11, which represents a rate of 37.90%, and there were 36 cases of atopic dermatitis in children and adolescents between the ages of 12 and 15, which represents a rate of 31.03%. There were 15 persons under the age of 18, which accounts for 12.9%, and there were 21 cases, which accounts for 18.10%, of children between the ages of 4 and 7. This lends credence to what Abuabara and colleagues found in their investigation.

In 82 out of 84 households (70.68%), there was at least one individual living with Alzheimer's disease.Andersen and colleagues discovered that the results of these studies strongly agree with one another.

Itching and dry skin were the two symptoms of AD that were mentioned the most frequently by respondents. Itching was mentioned by all of them (100%) and dry skin was identified by 90% of them. 51 patients in this study had involvement in the flexor muscles (43.96 percent), 32 patients had involvement in the cheek muscles (27.58 percent), 25 patients had allergic rhinitis (21.55 percent), and 8 patients had asthma (6.786 percent).The results agree with the conclusions drawn from the research that was carried out by Blumberg et al.

In our sample, there were 31 people who reported having problems falling asleep, which is 35.34 percent of the total. There were 24 patients with AD who demonstrated hyperactivity (20.68%), and there were 38 patients with AD who exhibited attention deficit (32.75%). According to the findings of this investigation, AD may make ADHD symptoms worse [13]. A number of traits that are associated to AD have the potential to be able to predict whether or not a person with ADHD will have symptoms of both hyperactivity and attention impairment. A number of recent studies based on populations have revealed that AD may raise the risk of developing ADHD by as much as 1.5 times [14,15]. In this vein, we were able to show that poor sleep hygiene and a history of cheek involvement from atopy are significant predictors of attention deficit in the affected, whereas involvement of the flexors may be a key predictor of hyperactivity in AD patients. These findings are related to the fact that we have been able to show that poor sleep hygiene and a history of cheek involvement from atopy are strong predictors of attention deficit in the affected. In previous research, Lee and colleagues discovered a connection between ADHD and AD, as well as sleeplessness.

CONCLUSION

Atopic dermatitis is a common skin condition that dermatologists and general practitioners see patients with on a regular basis. The skin condition known as atopic dermatitis is brought on by a confluence of factors, including genetic predisposition and an impaired immune system. Recent research suggests that those who have had this skin illness for a significant amount of time may be more likely to develop mental comorbidities, with ADHD being the most common of these conditions. It is believed that the relationship between AD and ADHD is caused by the long-term psycho neuro-immunological and psychoendocrine consequences of chronic inflammation, chronic stress, disrupted sleep, and continual sensory input; however, this idea has very little support and is not widely accepted. In this piece of research, my colleagues and I argue that atopic dermatitis (AD) in childhood is one of the most important risk factors for attention deficit hyperactivity disorder (ADHD), and we investigate the myriad of pathways that may underlie this link. Additional research is necessary to investigate the numerous routes involved with such a multimorbid juvenile cohort in order to determine which prevention treatments are the most effective. It is possible that basic research that leads to the invention of novel medications for effective treatment, as well as efforts to discover therapeutic and psychiatric comorbidities, will help reduce the incidence of AD and ADHD occurring together.

Limitation of the study

It is possible that the findings of this study cannot be extrapolated to the entirety of the nation due to the small sample size and the fact that the research was conducted just at one hospital located within the Bogura cantonment.

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