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Research Article

BODY-SITE DISTRIBUTION OF ATOPIC DERMATITIS LESIONS AMONG CHILDREN IN AL QASSIM, SAUDI ARABIA

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Abstract:

Purpose : Atopic dermatitis [AD] is a chronic skin condition that's characterized by the presence of an itchy skin lesion of relapsing and remitting nature. It's common among children with an incidence of 9-37% worldwide. Until now, there's no consensus among experts regarding the distributive pattern of AD. AD has a significant impact on the quality of life for the parents of the affected children, due to the chronicity of the disease and the inconvenience of the treatment regimens. The aim of this study is to examine the distribution of AD lesions among children and parental stress of their mothers in Al Qassim, Saudi Arabia.

Patients and Methods : This cross-sectional study was conducted between January 2020 to September 2020 at Al Qassim Region, Saudi Arabia. A self-administered questionnaire was distributed via online methods to 330 parents with children diagnosed with AD, 300 questionnaires were analyzed.

Results : The face, upper chest, and antecubital fossae were the most common sites affected in the children with atopic dermatitis. There was variation with age, with AD being more frequent on the face in younger children and such occurrence diminishing with age. Lesions involving the face, trunk, or flexures were significantly associated with higher Stress among mothers.

Conclusion : Atopic dermatitis distributions and skin reaction patterns are influenced by the patient's age and gender. The consequences of some distributive patterns of children with AD were associated with a high level of stress among mothers. The discordances in the phenotypes of AD among children should be recognized by Physicians to diagnose and evaluate the severity of AD.

Keywords: Atopic dermatitis, children, distribution, lesions, parental stress.

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INTRODUCTION:

Atopic Dermatitis [AD] is a chronic skin condition, characterized by the presence of an itchy skin lesion of a relapsing and remitting nature [1]. AD is a common dermatological condition especially in children with an incidence of 9-37% worldwide [2]. While the pathophysiological mechanisms by which AD develops remain unclear; genetic and environmental elements have been suggested [3]. AD affects the face and head in 90% of the affected infants and children [1] Until now, there is still no consensus among experts regarding the distributive pattern of skin lesions. A study conducted in Japan demonstrated that the most affected body surfaces are the flexures, another study in both Northern and Southern America was also supportive of this finding [4]. In contrast, another study in the United States declared that the most commonly affected site is the scalp, face, and antecubital fossa [1]. A study in Oregon, United States illustrated the dorsum aspect of the hand to be the most affected site regardless of age [5]. In Jizan, Saudi Arabia, a similar study had been conducted and estimated the prevalence of AD to be 11.4% with the neck, face, and trunk being the most commonly affected regions along with the elbows and legs after the age of seven years old [6]. These discordances in the phenotype of AD could be explained by the diversity of ethnic groups studied, participants age, clothing patterns, skin tone, and environmental factors [7,8]. To the best of our knowledge, there is a lack of local studies investigating the pattern of AD lesions in the body. Because of the chronicity of AD and the inconvenience of treatment regimens, it causes a significant impact on the quality of life for the parents of the affected children. Marciniak et al. evaluated the impact of AD on the quality of life of parents of children with AD using the Family Dermatology Life Quality Index [FDLQI]. Findings included that the disease affected negatively on the mother's wellbeing, this was manifested as fatigue, exhaustion, sleep disturbances, and difficulty of relaxation. As for the fathers, it affected mainly their work as they needed some days off, inability to work, and decrease number of hours worked [9]. Similar results were also found by Yang et al. where caring for a child that has an AD can really be stressful for the parents making them feel anxious, depressed, and helpless. Parents' marital relationships also can be affected due to the huge amount of commitment needed for the care of the affected child. In addition, the high cost of direct medical care causes a financial burden on parents [10]. The lack of knowledge about psychological and functional impact in parents of AD children in Saudi Arabia suggests new areas for research, to highlight the magnitude of influence of

this chronic disease on the quality of life of the caregivers. Moreover, there are no studies of this kind conducted in Al Qassim region, Saudi Arabia. Therefore, this study aims to examine the distribution of AD lesions among the affected children, as well as, evaluate the parental stress level of the mothers of the affected children, in Al Qassim, Saudi Arabia.

MATERIAL AND METHODS:**Study design**

This observational analytical cross-sectional study was conducted over a period of 5 months, from January 16, 2020 until May 30, 2020.

Study setting and sample size:

A convenient sampling method was used in this study. The included participants were 300 children and their parents in Al Qassim region, Saudi Arabia. They were approached through an online questionnaire that was sent via social media applications.

Study participants:

The inclusion criteria were parents of a child with AD who had been diagnosed for at least 1 month, resided in the same house with the child, and had prime responsibility for the child's care. The exclusion criteria were applied as follows: caregivers who did not understand the Arabic language, as well as, children over 7 years old.

Data collection methods:

Two self-administered questionnaires were sent via social media platforms to 300 mothers having children suffering from AD. The first survey was composed of two parts. The first section was inquiring about sociodemographic elements, personal or family history of AD, and questions pertinent to the child with AD such as [gender, date of birth, age at diagnosis, number of medications, and duration of treatment]. The second part was composed of questions from the Parental Stress Scale [PSS]. The PSS is a validated and reliable tool to screen for stress in parents that is mainly caused by their parenting duties and responsibilities [11]. It is composed of eighteen questions and each question has answers ranging from strongly agree to the extreme opposite which is strongly disagree this method is also known as the 5-point Likert scale. The second survey is the widely used Patient-Oriented SCOring for Atopic Dermatitis [PO-SCORAD][12], this survey starts with a human diagram to help the parent color the area that corresponds with the location of AD on their child's body, followed by questions with pictures to delineate the presence and extent of other skin conditions that may accompany

the AD lesion such as [Erythema, Edema, Lichenification, and Excoriation]. Both questionnaires were translated to the Arabic language. Then, they were validated by two medical doctors with substantial expertise in dermatology and who are acquainted with the surveys.

Ethical Consideration:

The present study was approved by the regional bioethical committee of the Qassim region. Informed consent was obtained from each patient to participate in our study. Investigators were ascertained enough protections to respect and safeguard the privacy of the research patients throughout the study.

RESULTS:

The 300 children and mothers demographic characteristics are presented in table 1. The majority of the children were male 175 [58.72%] and aged 0-2 , 124 [46.1%]. More than 70% of children were diagnosed in the age groups 0-2. For the mothers, approximately 80% were aged 18-40 and 19.52% were above the age of 41. Most of the mothers were married 257 [86.24%] and had a bachelor's degree 218 [73.9%]. About [71.48%] of mothers never had atopic dermatitis before.

Table1: Characteristics of the study sample.		
Variable	Frequency	%
<u>Mother demographic :</u>		
Age [mother]:		
18-30	123	42.12
31-40	112	38.36
> 41	57	19.52
Marital status:		
single	22	7.38
Married	257	86.24
divorced	16	5.37
widowed	3	1.01
Education level:		
Not completed	7	2.37
Primary education	6	2.03
High school education	64	21.69
Bachelor's degree	218	73.90
Employment:		
Working	135	45.61
Not working	150	50.68
Retired	11	3.72
Have you ever had atopic dermatitis?		
Yes	85	28.52
No	213	71.48
<u>Child demographic :</u>		
Gender[child]:		
Male	175	58.72
Female	123	41.28
Current age[child]:		
0-2	124	46.10
3-5	72	26.77
6-7	73	27.14
Age at diagnosis of AD [child]:		
0-2	217	74.57
3-5	44	15.12
6-7	30	10.31
When was the first time when you heard about atopic dermatitis?		
Before diagnosis	118	40.97
After diagnosis	170	59.03

Distribution of lesions:

AD lesions were more frequently reported on the face, upper chest and anticubital fossa [figure 1]. Nearly half of AD patients 149 [50.85%] reported complete symmetry, followed by non-symmetry 109 [37.20%] and partial symmetry 35 [11.95%] of the lesions on the body [Table 2].

Males had significantly more lesions on the flexures than females [66 [37.71%] and 32 [26.02%] , respectively]. The face was involved more frequently in the age group of 0-2 years, followed by the age group 3-5 years [p=0.0297].

In patients aged 6-7 years, the proportion of AD lesions was significantly higher on flexural and buttocks or genitals [33 [45.21%] and 15 [20.55%], respectively].

Complete symmetric distribution of the lesions was observed significantly more in patients aged 0-2 years, 51 [42.15%].

Patients who had onset of AD at age 0-2 years, were significantly more likely to have lesions on the face in compared to the higher age onset, 136 [62.67%], [P= 0.0004].

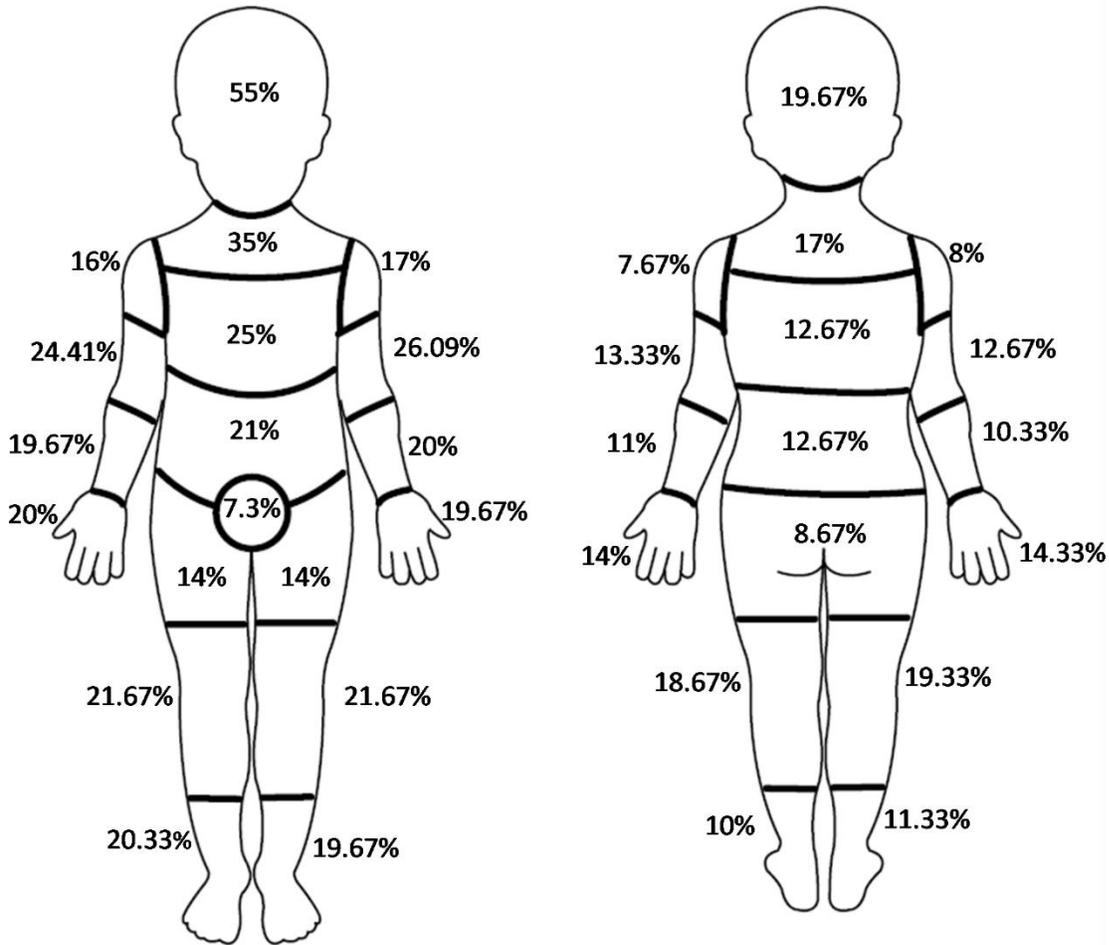


Figure 1 : Percentages of body sites involvement with current atopic dermatitis lesions

Table2: Distribution and symmetry association with [Age, Age at diagnosis and Gender].

Distributi on_ Freq. %	Overall 1 [N=30 0]	Age				Age at diagnosis				Gender		
		0-2 [N=12 4]	3-5 [N=7 2]	6-7 [N=7 3]	P value	0-2 [N=217]	3-5 [N=4 4]	6-7 [N=3 0]	P value	Male [N=17 5]	Femal e [N=12 3]	P value
Scalp	57 19.00	24 19.35	16 22.22	11 15.07	0.569 7	44 20.28	9 20.45	4 13.33	0.704 7	33 18.86	24 19.51	0.882 4
Face	165 55.00	79 63.71	37 51.39	33 45.21	0.029 7	136 62.67	17 38.64	10 33.33	0.000 4	95 54.29	69 56.10	0.813 3
Trunk	142 47.33	64 51.61	30 41.67	31 42.47	0.304 4	110 50.69	19 43.18	9 30.00	0.092 6	80 45.71	61 49.59	0.556 3
Flexural	98 32.67	30 24.19	28 38.89	30 41.10	0.019 9	73 33.64	13 29.55	9 30.00	0.872 4	66 37.71	32 26.02	0.044 8
Extensor	87 29.00	32 25.81	21 29.17	23 31.51	0.652 1	69 31.80	9 20.45	6 20.00	0.182 8	59 33.71	28 22.76	0.051 9
Hands	86 28.67	33 26.61	20 27.78	25 34.25	0.504 0	62 28.57	10 22.73	12 40.00	0.259 4	49 28.00	36 29.27	0.896 4
Buttocks genitals	37 12.33	10 8.06	9 12.50	15 20.55	0.044 0	29 13.36	7 15.91	1 3.33	0.232 2	22 12.57	15 12.20	1.000 0
Symmetry					0.010 3				0.109 2			0.332 6
Complete	149 50.85	51 42.15	38 53.52	49 69.01		103 48.58	20 45.45	21 75.00		91 53.53	57 47.11	
Partial	35 11.95	17 14.05	9 12.68	6 8.45		27 12.74	5 11.36	2 7.14		22 12.94	13 10.74	
Nonsymm etric	109 37.20	53 43.80	24 33.80	16 22.54		82 38.68	19 43.18	5 17.86		57 33.53	51 42.15	

Impact of lesions' distribution on parental stress level:

As shown in Table 3, we found that parenting stress level was significantly higher in mothers who themselves had AD before [61.56 ± 4.91] than those who never had AD [60 ± 4.4] [P < 0.001]. Mothers of girls experienced higher levels of parenting stress

than mothers of boys [61.41 ± 4.14 and 59.73 ± 4.76 respectively], [P=0.0017]. The total score of parenting stress was higher for mothers of children with AD lesions on the face and trunk [61.06±4.52, 61.11±4.41] [P= 0.02, 0.01, respectively].

Table3: Association of variables with parental stress scale.		
Variable	Mean±SD	P value
Age [mother]:		0.0647
18-30	60.89±4.11	
31-40	59.72±4.71	
> 41	61.04±5.25	
Marital status		0.4878
single	59.82±4.19	
Married	60.63±4.36	
divorced	59.06±6.39	
widowed	55.33±12.5	
Education level		0.3673
Not completed	57.71±5.59	
Primary education	58.33±4.76	
High school education	60.36±4.09	
Bachelor's degree	60.61±4.69	
Employment		0.6384
Working	60.34±4.75	
Not working	60.69±4.21	
Retired	58.82±7.39	
Number of other children in the family [not including the child with AD]		0.7412
No children	60.93±4.17	
1 child	61.09±4.28	
2-4 children	60.26±4.58	
More than 4 children	60.02±5.29	
Have you ever had atopic dermatitis ?		0.0015
Yes	61.56±4.91	
No	60±4.4	
Gender[child]:		0.0017
Male	59.73±4.76	
Female	61.41±4.14	
Current age[child]:		0.9631
0-2	60.4±4.84	
3-5	60.57±4.26	
6-7	60.63±4.39	
Age at diagnosis of AD [child]:		0.1717
0-2	60.66±4.49	
3-5	60.39±4.74	
6-7	58.77±5.16	
Symmetry		0.1009
Complete	60.13±4.26	
Partial	59.86±4.18	
Nonsymteric	61.01±5.15	
Scalp		0.7510
No	60.44±4.64	
Yes	60.44±4.4	
Face		0.0203
No	59.69±4.57	
Yes	61.06±4.52	
Trunk		0.0154
No	59.84±4.67	
Yes	61.11±4.41	
Flexural		0.0327

No	60.78±4.85	
Yes	59.74±3.93	
Extensor		0.1541
No	60.66±4.7	
Yes	59.92±4.28	
Hands		0.3575
No	60.6±4.59	
Yes	60.06±4.58	
Buttocks genitals		0.4851
No	60.37±4.61	
Yes	60.95±4.4	

DISCUSSION:

To the best of the authors' knowledge, this is the first research study to investigate the pattern of distribution of AD lesion in children living in Al Qassim Region, Saudi Arabia and its relation to their parent's psychological health using the PSS. The distribution of AD lesions can be influenced by different factors such as, ethnicity, age, and presence of infection [7]. In our study the most common affected body surfaces with AD are the face, trunk, and flexures. Whereas the buttocks and genitals were the least affected. Although not statistically significant, the trunk was the second most common affected body surface, there was a statistical significance regarding the buttocks and genitalia which is an uncommon finding, those two findings require further exploration. Child gender and location of the AD were highly associated with an increased PSS score and hence, maternal stress. With respect to distributive pattern of AD, a study in Kerman, Iran demonstrated that the head and neck are the most affected body areas with AD and this finding is in agreement with our finding [7]. However, another study found that the flexures are the most predilected area for AD [4]. AD lesion site is highly associated with skin tone. Indeed, extensor surfaces involvement were most commonly encountered in Nigerian children due to their darker skin tone [13]. A local study has been conducted in Jizan, Saudi Arabia and have proven that children below the age of seven years have a tendency to develop the AD rash on the face and trunk, and the flexures after the age of seven [6]. Age group, ethnicity, skin tone and different environmental factors such as humidity, latitude and temperature could explain the discrepancies between the sites of AD in the aforementioned studies, however, future investigation is needed to elaborate more on the relationship between AD and the environment [3,14,15]. In our study, stress levels were higher in parents with prior history of AD, this could be explained by the fact that AD is a chronic illness that starts at early childhood and require a rigorous long-term management, this devotion can

cause stress and sleep deprivation during adulthood [16]. Stress was more prevalent among mothers taking care of AD children, indeed, some forms of AD can cause persistent and unpleasant pruritus, sleep deprivation and continuous crying at night and these elements could contribute to increase stress in the caregiver [17]. Financial burden can contribute to these high stress levels, AD children require long-term specialized parental care including procurement of air filters and humidifiers, changing carpets, specialized shampoos and emollients and these commodities eventually will put a strain on the family's financial status [18,19]. Due to the chronic wax and wane pattern of AD, parents have reported more frequent visits to the dermatologist's office and this can affect family relationships and disrupt their dynamics [20]. Our study has a few limitations, first, due to the small number of participants and the location of the study which Al Qassim region, we cannot generalize our findings. Second, the data were collected using online self-administered questionnaire and this type of data collection can have a high chance of different kinds of bias. We urge future researches to replicate our methodology with little improvements including increasing the sample size, and performing interviews instead of self-administered questionnaires.

CONCLUSION:

Atopic dermatitis distributions and skin reaction patterns are influenced by the patient's age and gender. In our study, the most common affected body surfaces with AD are the face, trunk, and flexures. We have also found a unique tendency in the involvement of the lesions on buttocks in patients aged 6-7 years. Moreover, the consequences of some distributive patterns of children with AD were associated with a high level of stress among mothers. The discordances in the phenotypes of AD among children should be recognized by Physicians to diagnose and evaluate the severity of AD.

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Disclosure:

The authors report no conflicts of interest in this work.

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