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Atopic Dermatitis Severity in Children Treated at Chris Hani Baragwanath Academic Hospital and Parent/Caregiver Knowledge on the Disease

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Abstract

Background: Atopic dermatitis (AD) is an inflammatory skin condition characterized by pruritus, a relapsing course, and usually begins in infancy. AD has an impact on the quality of life in children and has been shown to interfere with normal development and education.

Objectives: To determine the severity of AD in children at Chris Hani Baragwanath Academic Hospital, caregiver general knowledge of the disease, and the relationship between the two.

Methods: This cross-sectional study was conducted on 215 paediatric dermatology patients. The children and caregiver's demographic data were collected. The children were examined, and the severity of AD was calculated using the SCORAD scale. The general knowledge AD questionnaire was used to assess the caregiver's knowledge of the disease. The relationship between the severity of AD and the general knowledge of the caregivers was also assessed.

Results: Approximately 98.6% of patients studied were black African. Sixty-nine per cent of the children had moderate severity of AD. Two thirds (n=145) of caregivers knew about the importance of moisturisers in caring for patients with AD. A weak direct relationship was found between the parent's level of education and general knowledge at r = 0.198 [p value= 0.004]. There was no statistically significant relationship between AD severity and the caregiver's general knowledge of AD [p value= -0.873].

Conclusion: Our patients had moderate AD and relatively good caregiver AD general knowledge. There was no statistically significant relationship between AD severity and the caregiver's general knowledge about AD.

Keywords: Atopic Dermatitis; Phototherapy; Erythema and Oedema; Dermatology

Introduction

Atopic dermatitis (AD) is one of the most common skin conditions seen in paediatric dermatology clinics, which was also seen in a study conducted in South Africa [1]. It is characterized by pruritus and a relapsing course [2]. Atopic dermatitis is increasing in both incidence and prevalence worldwide [3-5]. The highest prevalence of AD is in the first 16 years of life [5,6]. Genetics, skin barrier defect, environmental factors, and immune dysregulation play a role

in the pathogenesis of AD [1]. Malik K, et al. [7] emphasized the role of a defective skin barrier (reduced ceramides) in the aetiology of AD, and how this can be a target for both prophylaxis and treatment of AD. Management of AD includes general measures (basic skin care, moisturising skin, and avoiding triggers) and specific treatment (corticosteroids, tacrolimus, phototherapy, immunosuppressants, and molecular therapy) [8]. Poor management of AD can impair the quality of life of these patients [9,10] and educational intervention is important in the successful management of AD [11].

Clinical assessment of AD assists in selecting treatment and monitoring response [12]. There are different ways of grading the severity of AD using a score [13]. Studies have shown that the EASI (Eczema Area Scoring Index) and SCORAD (Scoring Atopic Dermatitis) are the best instruments to assess the severity of AD [14-16]. Furthermore, Al-Afif K, et al. [4] concluded that the SCORAD index is the most sensitive method for scoring moderate to severe atopic dermatitis. Moderate and severe atopic dermatitis are the most common types of AD seen in a clinic affiliated to a tertiary center [17]. The SCORAD index is divided into sub-sections A, B, and C (see Appendix 5). Sub-sections A and B are more objective as compared to sub-section C, which is more subjective. Eighty percent of the SCORAD score is objective, thus reducing bias in the assessment [18]. It may be difficult to assess erythema and oedema in black patients as the dark skin (Fitzpatrick IV-VI) may lead to under-scoring of the disease severity in sub-section B [19]. The methods used to mitigate this include: the use of post-inflammatory hyperpigmentation for erythema; high clinical exposure to black skin; and the development of electronic applications (Apps) for PO-SCORAD/SCORAD scale (showing pictures of lesions in dark skin and light skin) [20-22]. There is reported improvement in assessing black skin with increased exposure to this skin type [20-22].

Patient knowledge is usually assessed using a questionnaire, which is often validated by a team of professionals [18,23-26]. Most questionnaires use a multiple-choice method of assessment, with a single most correct answer or use the Likert scale [27]. The Likert scale involves grading opinions on a particular statement using the options: strongly agree; agree; neutral; disagree; or strongly disagree [27]. A Likert scale is a tool that is usually used to measure the participant's attitude in a scientifically accepted and validated manner [27]. A modified Likert scale (Likert-like) was used in this study, which used both methods to assist in grading the knowledge (single most correct answer), and assessing their understanding and attitude around certain concepts in AD. The education of caregivers and AD patients has been shown to play a major role in their treatment [11]. The use of an "eczema school" has been shown by multiple authors to assist in the management of these patients [28-33]. This is by ensuring appropriate use of treatment and by improving compliance. Al-Afif K, et al. [4] looked at the factors affecting the general knowledge in caregivers of children with asthma. A high level of education, family history, and a previous history of hospitalization were associated with a good general knowledge [34].

Research done by Cork M, et al. [23] identified poor caregiver knowledge as one of the factors that contribute to poor treatment outcome. However, we did not find a study on caregiver knowledge about AD and its severity in South Africa. Therefore, our proposed study aim was to determine the severity of AD and parental knowledge of the disease. We also wanted to determine the relationship between the severity of AD and parental knowledge of the disease. The outcome of the research could be used to design cost effective measures of improving patient care.

Ethics

Permission was obtained from the head of the Department of Internal Medicine and the chief executive officer of CHBAH. The Human Research Ethics Committee (Medical) of the University of the Witwatersrand gave clearance for the study (clearance number: M191056, see appendices). Consent and assent were obtained from the caregiver before the data was collected.

Methods

This is a cross-sectional prospective study that was conducted at the CHBAH. The CHBAH is the fourth largest hospital in the world, located in Soweto township, Gauteng, South Africa [35]. It is a tertiary hospital affiliated with the University of the Witwatersrand. The study was conducted at the Paediatric Dermatology clinic from the 13th January 2020 to the 30th August 2020. The children were from the ages of three months to 16 years. They all met the Hanifin and Rajka diagnostic criteria for AD [36]. Patients must have attended the clinic at least once in the past 6 to 24 months. Participants were given the information sheet, and both consent and assent were obtained from the parent or guardian. Consent forms were for all caregivers while assent forms were filled in for all the children by the caregiver. The primary investigator (the doctor) made the clinical assessment, translated for participants, and collected all the data. On each day of data collection, the first 40 patients attending the paediatric dermatology clinic with a confirmed diagnosis of atopic dermatitis were given a number (from 1 to 40). On day one of the data collection the patients with odd numbers were recruited to participate in the study (20 patients), and on day two of data collection 20 patients with even numbers were recruited to participate in the study. Odd numbers and even numbers were used on alternate days of data collection until data for all 215 patients was collected.

The study was carried out after routine dermatology consultation. Patients had the option of proceeding to the pharmacy or staying longer to take part in the study. Only the patients that agreed to be part of the study were selected.

We used a data collection sheet to record: the demographic data of the patient and the caregiver; the clinical information; and answers to the questionnaire (see Appendix 6). The demographic data included ethnicity; age and sex of both patient and caregivers. We also obtained the caregiver's highest level of education. The caregiver's level of education was classified using both local and International Standard Classification of Education [37] (ISCED-11). The ISCED classifies education into these levels: X-no schooling; 0-early childhood education; 1-primary education; 2-lower secondary education; 3-upper secondary education; 4-post secondary non-tertiary; 5-short cycle tertiary education; 6-bachelors/equivalent; 7-master's/equivalent; 8-doctoral/equivalent: and 9-not elsewhere classified [38].

A clinical assessment of the child's skin was done and the child was given a severity score using the SCORAD scale (see Appendix 3). A total SCORAD score classified the child's eczema into: Mild (<25); Moderate (25-50); and Severe (>50).

The caregivers answered questions about their general knowledge of AD in their preferred language (English, Isizulu, or Sesotho). The doctor translated the questions if there was a need and filled in the answers for all participants. Questions were answered using the Likert-like scale with single most correct answer used to get a score. The questions were modified and adapted with special permission from a study done by Professor Corinna Rea, an assistant Professor at Harvard Medical School (see Appendix 7). The questions were fact based, while some relied on the parent's assessment of their own understanding. The caregiver's questionnaires were marked out of eight questions (one most correct option) and converted to a percentage. These captured and graded the general knowledge of caregivers. The caregiver's total scores were divided into three groups: 0-49%; 50-69%; and >70%. The use of the Likert- like scale also assisted in capturing the feelings, actions or opinion of parents from some of the questions.

The relationship between the children's AD severity and the general knowledge of the caregivers was determined using a correlation test. The Pearson's correlation test was selected after specific assumptions were met. For the non-parametric alternative, where assumptions were violated, Spearman's Rho was used. This gave direct (positive value) or an indirect (negative value) relationship with further description of the strength of the relationship. A direct relationship means that as one increases, the other increases, while an indirect relationship means that as one increases the other decreases. The r value measures the strength of the relationship (r-0.1-0.29=weak; r-0.3-0.49=medium; r-05-1=strong) [39]. The sig (2-tailed) assesses whether the relationship is statistically significant (it is regarded as significant at <0.05).

Results

Demographic Data

From the 215 children sampled, 212 (98.6%) were black, two (0.9%) were of mixed ancestry, and one (0.5%) was Indian. The ethnicity of the caregivers and the children were the same. The children's ages ranged from three months to 16 years. A total of 53 (24.7%) children were less than two years of age, 129 (60.8%) were from two years to 10 years, and 33 (15.3%) were from 11 years to 16 years. The majority (58.6%) of the children were males.

Out of the 215 caregivers that we interviewed, 192 (89.3%) were female and 23 (10.0%) were male. The caregiver's ages ranged from 18 to 65 years. Forty-nine (22.8%) of the caregivers were younger than 25 years, 152 (69.8%) were between 25 and 45 years, and 14 (6.5%) were older than 45 years. Only three (1.4%) of the caregivers had no formal education (ISCED X), 63 (29.3%) had an educational level below grade 12 (ISCED 0-3), and 81 (37.7%) had only obtained grade 12 (ISCED 4). There were 34 (15.8%), caregivers with a post-grade 12 certificate (ISCED 5). There were 28 caregivers (13.0%) with a diploma (ISCED 6). Only six (2.8%) caregivers had a degree (ISCED 7).

Severity of AD

The severity of AD using the SCORAD scale (n=103) averaged 31.85 (sd=10.23), which is moderate AD. Out of the 215 patients, 54 (25.1%) had mild AD, 148 (69.8%) patients had moderate AD, and only 13 (6.0%) had severe AD. Figure 1 below summarises the severity of AD in the study population.

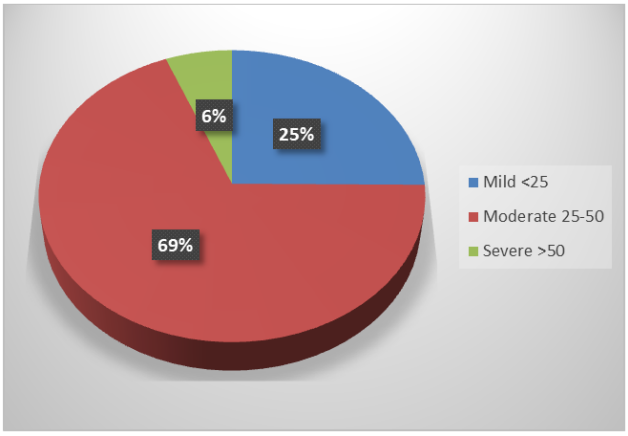

Figure 1: Severity of Atopic Dermatitis using SCORAD scale.

Caregiver's General Knowledge of AD

General Knowledge Score: The average caregiver knowledge score (n=8) was 82.3% (s=15.5). Only four (1.8%) caregivers scored between 0- 49%, 33 (15.3%) scored between 50% and 69%, and 178 (82.8%) scored more than 70.0%. Figure 2 summarises the general knowledge score amongst the caregivers.

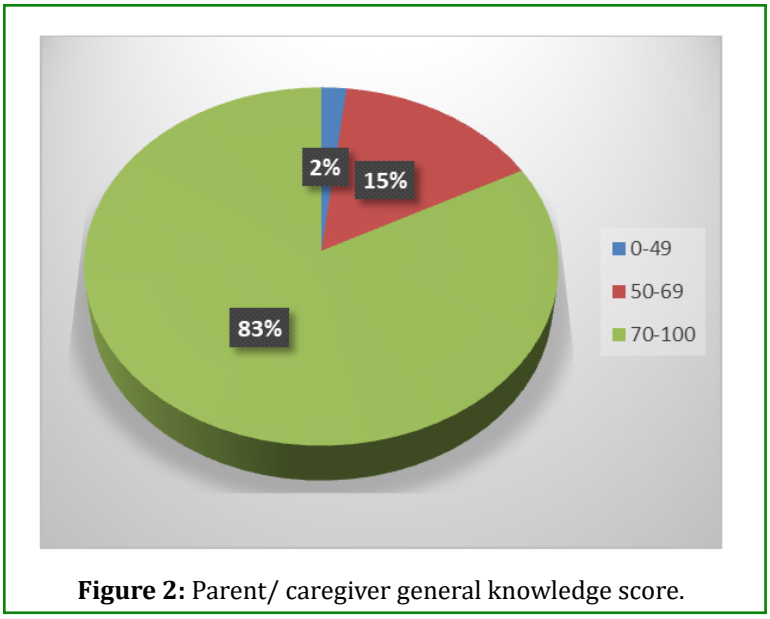

Figure 2: Parent/ caregiver general knowledge score.

Review of Specific Questions of Interest Using the Likert-Like Scale: A total of 145 (67.4%) caregivers agreed that keeping the skin moist by applying lotions was an important part of AD skincare. Two hundred and nine (97.2%) caregivers agreed or strongly agreed that scented soaps and lotions should be avoided. A total of 202 (93.9%) caregivers agreed or strongly agreed that moisturisers should be applied generously all over the body. The majority (68.0%) of the caregivers did not think that topical steroids have side effects. Figure 3 summarises the findings.

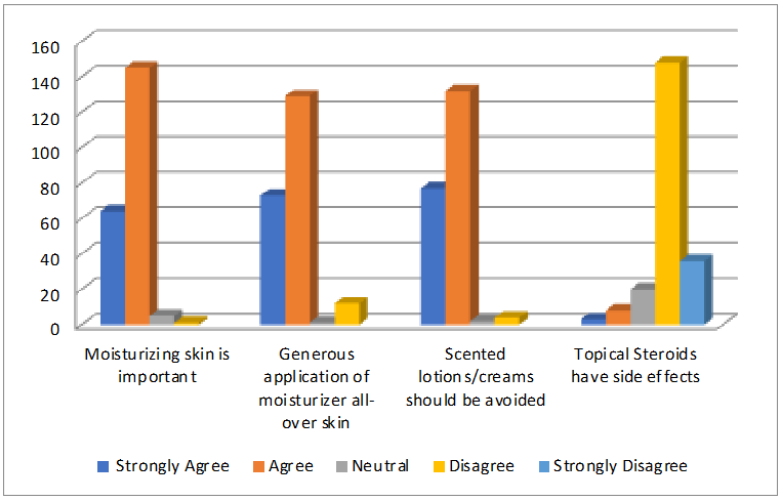

Figure 3: Review of specific general knowledge questions (Likert-like scale).

The relationship between AD severity and caregiver general knowledge Table 1 below shows the distribution of the caregiver's general knowledge score when compared with disease severity. Most of the caregivers had good (70-100%) general knowledge, regardless of the severity of the child's AD.

Severity of AD	Caregiver's general knowledge		
	0-49%	50-69%	70-100%
Mild AD	1	13	40
Moderate AD	1	18	121
Severe AD	2	2	17

Table 1: The relationship between atopic dermatitis (AD) severity and caregiver general knowledge.

The relationship between AD severity and the caregiver's general knowledge was investigated using the Pearson's product-moment correlation coefficient. There was no violation of the level of measurement, pairs were related, observations were independent, and normality was assumed as the number of participants was greater than 30 (n>30). There was no statistically significant relationship between AD severity and the caregiver's general knowledge (with p value of 0.87). Table 1 summarizes the findings.

Characteristic	Test done	Value	Result
AD severity and Caregiver knowledge	Pearson's correlation	r = -0.01, p value =0.87	Not statistically significant
AD severity and Age of caregiver	Pearson's correlation	r =0.33, p value =0.63	Not statistically significant
General knowledge and Age of caregiver	Pearson's correlation	r =0.13, p value =0.56	Not statistically significant
General knowledge and Level of education	Spearmen's Rho correlation	r =0.19, p value =0.004	Direct statistically significant

Table 2: Correlation between AD severity, caregiver knowledge, and other factors.

There was no statistically significant relationship between caregiver's age and AD severity (with p value of 0.63). There was no statistically significant relationship between the caregiver's AD general knowledge and the caregiver's age at (p value = 0.56). Table 2 above summarises the findings.

The Spearmen's Rho showed a weak direct relationship between the level of education and the caregiver's general knowledge at r = 0.19. This was found to be statistically significant with p value = 0.004. Table 2 and figure 4 summarize the findings.

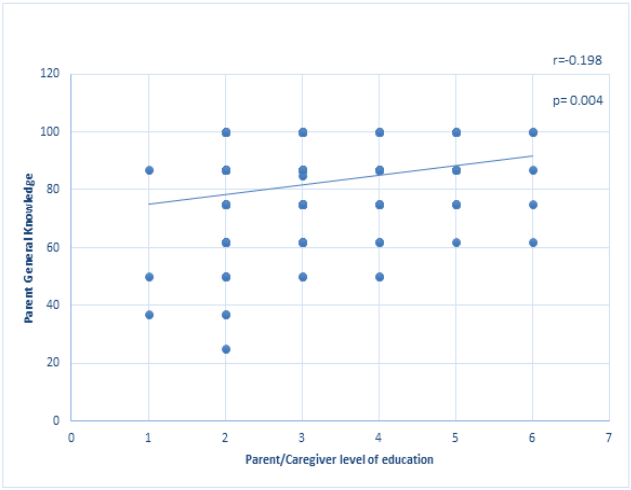

Figure 4: Simple scatter with fit line of parent general knowledge by parent/caregiver education (Correlation between caregiver's general knowledge and level of education).

Discussion

In this cross-sectional study done on 215 patients at CHBAH in Soweto, Gauteng, we looked at: the severity of AD; the general knowledge of the caregivers about the disease; and the relationship between the two.

The demographics of the patients were like those found internationally [10], but in our study, 98.6% of the patient sampled were African. Just over two thirds of the caregivers had an educational level of only grade 12 and below (ISCED X-4). This was different from an international study done in USA, Boston. In their study, Rea et al [10] used the same questionnaire and found that only a third of the caregivers had an educational level of ISCED- X-4 (high school/less). The discrepancy in education levels between the two studies could possibly emanate from the fact that our patients were sampled from a more disadvantaged community. This could affect caregiver understanding during patient education.

The majority (68.8%) of the patients in the study had moderate AD, which is in line with studies done globally [10,40]. This may also represent the pattern of local referrals to our centre. Our hospital is a tertiary centre that receives referrals of mainly moderate to severe AD [17]. In addition, the patients that we studied had attended the paediatric dermatology clinic at least once in the past 6 to 24months. This suggests better care and patient education received at the clinic.

The mean parental knowledge score was 82.0%. The findings were similar to those from international studies [10,26]. Rea et al found a mean parental knowledge score of 79% using the same questionnaire [10]. Our questionnaire was translated

into two commonly spoken languages in Soweto namely, Isizulu and Sesotho. This improved the understanding of the questions and the accuracy of the responses. Despite the majority of patients having a lower educational level than those in the Boston study, the high parental knowledge score could possibly be attributed to good counselling of patients in their home languages prior to the study. Foley A [41] from the Wits school of Education found that learning in one's native language improves understanding and performance. Sidbury R, et al. [42] looked at the role of educational interventions in patients and caregivers of children with AD and found that the educational interventions lead to the improvement in adherence to treatment and lessen the fears and misconceptions around the disease.

The majority (94.0%) of caregivers knew about the importance of generously applying moisturizers. This could possibly be attributed to good patient education in the teaching hospital. The findings were similar to a study by Topal Y, et al. [43], where 82.0% of participants knew about the importance of moisturizers in the treatment of AD. Multiple authors have supported the importance of moisturizers in treating patients with AD [7,8,43]. Some have even suggested that the appropriate use of moisturizers can prevent AD in 50.0% of high-risk infants [7,28]. Cork M, et al. [23] showed an 89.0% reduction in AD severity just by an increasing the use of moisturizers.

About two thirds of parents/ caregivers disagreed that topical steroids have side effects. These findings are similar to those from a study done in Sestre Milosrdnice University hospital centre. According to these findings, 78.0% of caregivers thought that topical steroids could be used without side effects as long as they are prescribed by a dermatologist [44]. This could possibly indicate the need for dermatologists to spend more time explaining how treatment works and its potential side effects. Some centres have implemented an "eczema school" to improve the knowledge of caregivers and patients with AD, resulting in the better management of these patients [42,30-34]. The "eczema school" is a structured multidisciplinary educational programme where both patients and their caregivers are educated about the pathogenesis, disease course, and the treatment of atopic dermatitis [42]. This can be done by having workshops, standard videos, pamphlets and other methods [42]. The standard video instruction as an educational method has been shown to be more effective than the other methods (e.g., pamphlets) [42].

There was no statistically significant relationship between AD severity and the parent/ caregiver's general knowledge. There are no similar studies that have been done locally to look at this relationship. Cork M, et al. [23] compared disease severity and parent knowledge of the disease (focusing on topical therapy). They found an indirect relationship (r=-0.628) between AD severity and knowledge of moisturizer use [23]. In the same study, educational interventions focusing on the use of moisturizers resulted in major clinical improvement [23]. Grillo M, et al. [30] found a reduction in AD severity associated with the improvement in caregiver knowledge. Moore EJ, et al. [34] also found a significant reduction in AD severity with increased caregiver knowledge. These studies that looked at the relationship between AD severity and parent knowledge only compared the relationship between the two after improving their educational intervention. They looked at whether the educational intervention lessened the severity of AD. We assessed the current knowledge and AD severity in patients who had already attended the clinic previously. There was no additional improvement in our educational intervention. This could explain the insignificant result that we found.

There was a weak direct relationship between the parent's level of education and general knowledge which was statistically significant ($r = 0.20$, p value = 0.004 at level 0.01). To our knowledge, there is no local study that has looked at this relationship. Our findings are similar to those from a study by Topal Y, et al. [43], who found that a high level of education is associated with better parental knowledge. Sidbury R, et al. [42] also found that the higher the level of education, the better the AD general knowledge. This could possibly be due to the ease in understanding and accessing information in the educated group.

The doctor made the assessment of AD severity, administered the questionnaire, and also translated the questions for some parents. This may have created some bias. There are other factors that affect the AD general knowledge of the caregivers [45]. Al-Afif K, et al. [4] found that in addition to the high level of education, family history of AD and previous history of hospitalization were also associated with a good general knowledge. Some of these factors were not considered in our study. We did not specifically document how long each of our patients had been attending the clinic prior to the assessment of AD severity and parent knowledge. This might have affected the AD severity score in the study, resulting in fewer patients with severe AD. We also did not enquire about whether or not the caregiver had another child with atopic dermatitis. This may have affected the parent knowledge score [46,47].

Conclusion

Atopic dermatitis is one of the most common skin conditions seen in paediatric dermatology clinics. It is important to understand how to manage these patients. Most of our patients had moderate AD, and relatively good caregiver AD general knowledge. We could not find any statistically

significant relationship between AD severity and the caregiver's AD general knowledge. Although our study found good caregiver's knowledge on moisturizer use in the management of AD, it found poor knowledge on topical corticosteroids side effects. This just indicates the need for improved AD education.

Our study has shown a relationship between parental knowledge of the disease and caregiver's highest level of education, however more studies still need to be done to look at this relationship and other factors that may affect patient management.

Conflict of Interest

Nil

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