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**Atopic Dermatitis: Relation Between Disease Severity,
Anxiety and Quality of Life in Children and Adults**

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Abstract:

Background: A high level of anxiety commonly reported in children and adults suffering from atopic dermatitis (AD). Measurement of the Dermatology Life Quality Index in adults (DLQI) and children (CDLQI) is recommended in AD patients to help assess and monitor the progress of those patients.

The aim of this work : Was to study the impact of AD on quality of life of patients and to investigate the relationship between severity of AD, anxiety level, and DLQI (CDLQI) in adults and children suffering form AD.

Patients and methods: The patients group in our study comprised 128 children and 30 adults suffering form AD, while the control group included 34 children and 13 adults with minor skin diseases (pityriasis alba and acquired melanocytic naevi respectively). The DLQI (CDLQI) and anxiety index were measured in both patients and control groups and the severity score of AD was calculated in patients group.

Results: Both children and adults suffering from AD have higher

anxiety level and lower dermatological life quality than the control group. In the AD group, anxiety index and severity score were significantly higher in adults than in children. In both adults and children, a significant positive correlation was found between severity of AD and DLQI (CDLQI), and between anxiety index and DLQI (CDLQI), but no correlation was found between severity score and anxiety index.

Conclusion: Our results confirm that AD has adverse effects on patients quality of life in both children and adults. Both the severity of the AD and anxiety associated with the illness act independently to produce a synergetic impairment of dermatological life quality. The results underscore the importance of proper psychological assessment and treatment of AD in addition to the standard dermatological treatment.

Introduction:

Despite the frequency of atopic dermatitis (AD), it is often viewed by the society and the medical community as a minor dermatologic condition. Many believe that it does not present any major difficulties for the family, patient, or society; however, research demonstrates that AD can be a major skin disorder with very significant costs and morbidity. AD in children can have a major effect on their quality of life, disrupting family and social relationships as well as interfering with recreational and school activities. In adults, it may interfere with employment opportunities or disrupt spousal relationships[1].

The psychological, physical and social impact of AD is complex and varies among different ages, and the effect of AD on the quality of life of children and their families are not well understood[2]. Some previous studies reported that both children and adults suffering from AD have a higher anxiety level than non-sufferers which improves with improvement in skin condition[3,4,5]. However, Ginsburg et al.[4] found no relationship between anxiety and severity of illness. Our work was done for three purposes: (1) to study the effects of AD on dermatologic life quality of children and adults in our locality; (2) to document any association between AD and anxiety; and (3) to investigate the relationship between the severity of AD, the dermatological life quality (DLQ) and anxiety.

Patients and Methods:

This study was conducted on 158 atopic dermatitis (AD) patients (92 males and 66 females) recruited from dermatology clinic of Mansoura University Hospital and from other dermatology clinics in Mansoura City. The patients group comprised 128 patients between 3 and 15 years old (i.e., having childhood AD) and 30 patients more than 15 years old (i.e., having adulthood AD). Infantile AD was excluded because of the difficulty of applying the

scales used in the study to this age group. Thirty four children with pityriasis alba and 13 adults with acquired melanocytic naevi were chosen as controls. They matched the patients group in age, sex, locality and socioeconomic status. Patients were included if they: (i) were between 3 and 60 years of age; (ii) were clinically diagnosed as having AD by a dermatologist according to Hanifin and Rajka Criteria[6], and (iii) suffered from no somatic or psychiatric diseases other than AD. The members of control group fulfilled criteria (i) and (iii). The nature of the work were described to all subjects of the study and all of them agreed to participate.

The quality of life of AD patients was assessed by Dermatology Life Quality Index (DLQI) in adults[7] and Children's Dermatology Life Quality Index (CDLQI) in children[8]. DLQI[7] is a 10-question self-administrated questionnaire which assess the type and degree of psychosocial impairment among dermatologic patients. The questions cover the psychosocial aspects and daily activities of patients after developing the disease and were divided into the following subgroups:

- 1-2 , symptoms and feelings,
- 3-4, daily activities;
- 5-6, leisure;
- 7, work;
- 8-9, personal relationships; and
- 10, treatment.

Each question has four alternative responses: "not at all", a "little", a "lot", or "very much" with 0, 1, 2 and 3 scores respectively. All the questions referred to the preceding week. The DLQI was calculated by summing the score of questions, resulting in a maximum of 30 and minimum of zero. The higher the score the greater the impairment of life quality. Figure (1) shows the translated Arabic form of the questionnaire which includes the modifications of CDLQI.

The CDLQI[8] is essentially similar to DLQI with modification in questions 3, 7, and 9. Accordingly, the questions were divided into the following subgroups: 1-2, symptoms and feelings; 4,5,6, leisure; 7, school, 3,8, personal relationships; 9, sleep; and 10, treatment. The CDLQI questionnaire was designed to be completed by the child, with the help of the child's parent. Scoring system was similar to DLQI.

The degree of anxiety among patients, secondary to AD, was assessed by an abbreviated scale derived from the Arabic version of the Anxiety Inventory which was translated and revised to suit our culture by El-Beblawy (1987)[9]. This scale consists of 20 questions to be answered by the patient by "yes" or "no" with corresponding scores "1" or "zero" respectively, and the total maximum score would be 20 (Fig. 2). The higher the score, the more is the degree of anxiety. The questions focus on the anxiety feelings of the patients, secondary to dermatitis, and its reflections on his daily activities. This anxiety inventory was designed for children with modifications in some

questions to be suitable for adults also. However, anxiety inventory was not applied to children under 6 years, as they would not reliably assimilate the meanings of the questions. So, it was applied only to 62 patients (32 children and 30 adults).

Scoring of severity of AD was done according to the method described by Costa et al. (1989)[10] who estimated the severity by combination of total score of two items: (A) Intensity of dermatitis, and (B) topography or extent of involvement of the skin by AD. The intensity of dermatitis (A) was represented by 8 severity criteria: 5 criteria evaluated by the dermatologist (erythema/edema, scaling/dryness, oozing/crusts/papulovesicles, lichenification and pigmentation) ranging from 0 to 3 and two visual analogue scales ranging from 0 to 6 on which the patient indicated the severity of pruritus and sleep loss. For topography item (B) each of the following 10 areas was scored from 0 to 3 according to the extent of involvement: feet, legs, hands, arms, popliteal fossae, antecubital fossae, face and scalp, buttocks, anterior aspect of the trunk and posterior aspect of the trunk. Total score (A + B) ranged from 0 to 60. Mild AD has a score <20, moderate AD has a score from 20 to 30, and severe cases have a score >30.

Statistical analysis was done using the SPSS program. Student "t" test compares differences between groups and Spearman's rank correlation was used to ascertain to correlation of variables within the AD group.

Dermatology Life Quality Index (DLQI)[7] and Children's Dermatology Life Quality Index (CDLQI)[8] and their Arabic translations are shown in Fig. (1).

1- Over the last week, how itchy. Sore. Painful or stinging has your skin been?	Very much A lot A little Not at all
2 - Over the last week, how embarrassed or self conscious have you been because of your skin?	Very much A lot A little Not at all
3 - Over the last week, how much has your skin interfered with you going shopping or looking after your home or garden?	Very much A lot A little Not at all
4 -Over the last week, how much has your skin influenced the clothes you wear?	Very much A lot A little Not at all
5 - Over the last week, how much has your skin affected any social or leisure activities?	Very much A lot A little Not at all

6 - Over the last week, how much has your skin made it difficult for you to do any sport?	Very much A lot A little Not at all
7 - Over the last week, has your skin prevented You from working or studying? If "No", over the last week how much has your Skin been a problem at work or studying?	Yes No ----- Very much A lot A little Not at all
8 - Over the last week, how much has your skin created problems with your partner or any of your close friends or relatives?	Very much A lot A little Not at all
9 - Over the last week, how much has your skin caused any sexual difficulties?	Very much A lot A little Not at all
10 - Over the last week, how much of a problem has the treatment for your skin been, for example by making your home messy, or by taking up time?	Very much A lot A little Not at all

كثير متوسط قليل لا يوجد	1- خلال الأسبوع الأخير كم كان كم الحكة (الهرش) أو الألم أو الحرقان فى جلدك
كثير متوسط قليل لا يوجد	2- مامدى تأثير المرض الحالى على مشاعرك خلال الأسبوع الأخير من حيث الضيق الانزعاج - الاضطراب - الارتباك أو الخجل أو الحزن؟
كثير متوسط قليل لا يوجد	3- الكبار: مامدى تأثير المرض الحالى على نشاطك اليومي داخل وخارج المنزل (التسوق مثلا) خلال الأسبوع الأخير.

كثير متوسط قليل لا يوجد	الأطفال: مامدى تأثير المرض على صداقاتك خلال الأسبوع الأخير؟
كثير متوسط قليل لا يوجد	4- مامدى تأثير المرض على نوع الملابس أو الأحذية التى ارتديتها فى الأسبوع الأخير؟
كثير متوسط قليل لا يوجد	5- الكبار: مامدى تأثير المرض على تمتعك بوقت فراغك أو على علاقاتك الاجتماعية خلال الأسبوع الأخير؟
كثير متوسط قليل لا يوجد	الأطفال: مامدى تأثير المرض على الخروج ، اللعب ، أو ممارسة الهوايات خلال الأسبوع الأخير؟
كثير متوسط قليل لا يوجد	6- مامدى تأثير المرض على ممارسة الألعاب الرياضية كالسباحه وغيرها خلال الأسبوع الأخير؟
كثير متوسط قليل لا يوجد	7- الكبار : هيل منعك المرض من مباشرة عملك خلال الأسبوع الأخير؟ ومامدى تأثير ذاك
كثير متوسط قليل لا يوجد	الأطفال: مامدى تأثير المرض على دراستك خلال الأسبوع الأخير؟

كثير متوسط قليل لا يوجد	8- الكبار: هل سبب لك المرض متاعب مع الزوج أو الأصدقاء أو الأقرباء خلال الأسبوع الأخير ومامدى ذلك؟
كثير متوسط قليل لا يوجد	الأطفال: خلال الأسبوع الأخير، مامدى المتاعب التى حدثت لك مع الآخرين بسبب المرض الحالى (كالشثيمه - الاستهزاء - السخرية - المشاجره - أو تجنب الآخرين لك)
كثير متوسط قليل لا يوجد	9- الكبار: مامدى تأثير المرض على علاقتك الجنسية مع زوجتك خلال الأسبوع الأخير؟
كثير متوسط قليل لا يوجد	الأطفال: مامدى تأثير المرض على نومك خلال الأسبوع الأخير
كثير متوسط قليل لا يوجد	10- مامدى المشاكل التى سببها لك العلاج خلال الأسبوع الأخير؟

Fig. (1): Translated Arabic form of DLQI questionnaire including CDLQI modifications.

Anxiety Inventory[9] and its Arabic translation Fig. (2)

The index of the level of anxiety is obtained by summing the number of these items answered "Yes".

1. It is hard for me to keep my mind on anything.
2. I feel I have to be best in everything.
3. At times I feel like shouting.
4. I am secretly afraid of a lot of things.
5. I feel that others do not like the way I do things.

6. I get nervous when things do not go the right way for me.
7. I worry most of the time.
8. I worry about what my parents will say to me.
9. I get angry easily.
10. Other children are happier than I.
11. I worry about what other people think about me.
12. I have worried about things that did not really make any difference later.
13. My feelings get hurt easily.
14. I worry about what is going to happen.
15. It is hard for me to go to sleep at night.
16. I worry about how well I am doing in school.
17. My feelings get hurt easily when I am scolded.
18. It is hard for me to keep my mind on my school work.
19. I often worry about what could happen to my parents.
20. I am nervous.

لا	نعم	1- من الصعب على أن أركز عقلي في أي شيء
لا	نعم	2- أشعر أنني لازم أكون أحسن واحد في كل شيء
لا	نعم	3- ساعات بأشعر أنني عايز أصرخ
لا	نعم	4- أنا بيني وبين نفسي باخاف من حاجات كثيره
لا	نعم	5- أنا باشعر أن الأطفال (الناس) التانيين لا تعجبهم الطريقة اللي باعمل بها الاشياء
لا	نعم	6- بابقى عصبى لما الأمور ماتمشيش زي ماأنا عايز
لا	نعم	7- أنا باحس بالضيق والزهد معظم الوقت
لا	نعم	8- أنا باضايق من كلام أمى وأبويا معايا (أهلى - عائلتى)

لا	نعم	9- أنا بغضب بسرعه
لا	نعم	10- أنا باشعر ان الأطفال (الناس) التانيين اسعد منى
لا	نعم	11- أنا بيقلقنى رأى الناس فيه
لا	نعم	12- أنا بابقى مشغول ومهموم بأشياء ببيان بعدين ان ماكانش لها أهمية فى الحقيقة.
لا	نعم	13- مشاعرى بتنجرح بسهولة.
لا	نعم	14- دائما عندى قلق على الأشياء اللى هاتحصل بعدين
لا	نعم	15- يقلقنى إزاي اكون كويس فى المدرسة (العمل)
لا	نعم	16- كثير مايقدرش أنام بالليل
لا	نعم	17- أتأثر كثيرا لما حد يوبخنى أو يؤنبنى
لا	نعم	18- ماأقدرشى أركز فى دراستى (عملى)
لا	نعم	19- باقلق كثيرا على اللى ممكن يحصل لأبويها وأمى (أهلى - عائلتى)
لا	نعم	20- أنا عصبى

Fig. (2): Translated Arabic version of anxiety inventory.

Results:

Our work included 158 AD patients and 47 patients with minor skin diseases as controls. Patients with AD and control subjects were divided into 2 groups: children group and adult group. The children group (age between 3 and 15 years) included 128 patients with AD and 34 children with pityriasis alba as controls. The adult group (age between 16 and 43 years) consisted of 30 AD patients and 13 adults with acquired melanocytic naevi as controls. Other clinical data are presented in table (1).

Table (1): Clinical data of patients and controls

	Children group	Adult group
Patients:		
* Total number	128	30
* Sex: Males	71	21
Females	57	9
* Age (mean \pm SD)	6 \pm 3.6	28 \pm 6.4
Controls:		
* Total number	34	13
* Sex: Males	19	8
Females	15	5
* Age (mean \pm SD)	5.5 \pm 2.9	31 \pm 5.6

Both CDLQI and DLQI scores were very high in both groups of AD patients in comparison with control diseases ($P < 0.001$) (Tables 2,3).

Table (2): CDLQI score and anxiety index in children with AD compared to control subjects (Pityriasis alba patients)

	AD patients	Controls	P
CDLQI score * (mean \pm SD)	9.8 \pm 4.5	2.9 \pm 1.3	< 0.001
Anxiety index ** (mean \pm SD)	6.1 \pm 2.7	2.6 \pm 1.1	< 0.001

CDLQI : Children's dermatology life quality index

* Number of patients was 128 and number of controls was 34

** Number of patients was 32 and number of controls was 12

Table (3): DLQI score and anxiety index in adult AD patients compared to control subjects (acquired melanocytic naevi patients)

	AD patients (n=30)	Controls (n=13)	P
DLQI score (mean \pm SD)	11.0 \pm 2.99	2.7 \pm 1.1	< 0.001
Anxiety index (mean \pm SD)	8.1 \pm 2.7	2.9 \pm 1.3	< 0.001

DLQI : Dermatology life quality index

Severity score and anxiety index were found to be significantly higher in adult AD patients compared to children ($P < 0.05$ & < 0.01 respectively). DLQI score was also higher than CDLQI score but the difference was statistically insignificant (Table 4).

Table (4): DLQI (CDLQI) score, severity score and anxiety index score of AD patients: comparison between children and adults

	Children * (n = 128)	Adults (n = 30)	P
Severity score (mean \pm SD)	27.9 \pm 8.34	31.5 \pm 9.7	< 0.05
DLQI (CDLQI) score (mean \pm SD)	9.8 \pm 4.5	11.0 \pm 2.99	NS **
Anxiety index score (mean \pm SD)	6.1 \pm 2.7	8.1 \pm 2.7	< 0.01

* Anxiety index was done for 32 children only.

** NS = non-significant.

In table (5), within the children AD group, a significant positive correlation was found between severity score and CDLQI, and between CDLQI score and anxiety index, but not between severity score and anxiety index. Similar correlations were found in adult AD group (Table 5).

Table (5): Spearman's correlation within AD patients between DLQI (CDLQI), severity score and anxiety index

	Correlation coefficient "r"		
	DLQI (CDLQI)	Severity score	Anxiety index
In children:			
CDLQI	-	0.52 *	0.47 *
Severity score	0.52 *	-	0.24 (NS)
Anxiety index	0.47 *	0.24 (NS)	-
In adults:			
DLQI	-	0.57 *	0.43 *
Severity score	0.57 *	-	0.22 (NS)
Anxiety index	0.43 *	0.22 (NS)	-

* Significant positive correlation

Each of the questions in CDLQI was correlated with severity score and anxiety index as shown in table (6). The strongest positive correlations were found between severity score and questions 9 (measuring sleep status) and questions 5 and 6 (measuring leisure time activities) followed by questions 1 and 2 (measuring symptoms and feelings). Weaker correlations were found between severity score and questions 3 & 8 (measuring personal relationship) and question 10 (treatment). No significant correlation was found on items 4 (cloths) and 7 (study). The strongest relation between anxiety index and CDLQI was found on items 9 (sleep) followed by items 3 & 8 (personal relationships). A weaker correlation was found on items 5, 6 (leisure). No significant relation was found between anxiety index and five items of CDLQI (50% of questions) which include questions 1,2,4,7 and 10.

Table (7) shows the results of correlations between different items of DLQI (in adult AD patients) and severity score and anxiety index. Severity score showed significant correlations with questions 1, 2, 3, 4, 5, 6, 10. The strongest relation between severity and DLQI was found on items 2, 3, 4 (measuring symptoms, feelings and daily activities) followed by question 10 (treatment). A weaker correlation was found on items 1,5 and 6 (measuring leisure time activities). No significant correlation was found between severity and item 7 (work), and 8 and 9 questions (personal relationships). Anxiety

index showed positive correlations only with 4 items of DLQI namely questions 8 and 9 (measuring personal relationships) and questions 5 and 6 (measuring leisure time activities).

Discussion:

Atopic dermatitis is a common and important skin condition which most often arises in infants and children and may persist to adulthood. Lewis-Jones and Finlay[8] have shown that, of all children's' skin conditions, AD has one of the greatest effects on the child's quality of life, disrupting family and/or social relationships and interfering with daily activities and normal development[11]. Peer and teacher acceptance may be affected by the appearance of the child and concerns about infectivity. These problems can lead to environmental, social and emotional deprivation, which negatively affect the course of the disease[12]. Also AD has been shown to have a significant adverse impact on the quality of life of adult patients[13].

For these reasons, the European Academy of Dermatology and Venereology (EADV)[14] recommended that dermatologists should incorporate health-related quality of life measurements to help assess and monitor the progress of their patients and, also, recommended that therapy should clearly demonstrate a positive influence on health-related quality of life. Previous studies reported that patients with atopic dermatitis have a characteristic psychological profile not shown by other skin diseases. These patients tend to be in a state of high manifest anxiety, depressed, neurotic, hypochondriachal and with problems in dealing with anger and hostility[15,16]. Moreover, adulthood AD patients were shown to be more prone to sense of stigmatization leading to shame, lack of confidence and curtailment of social and leisure activities[17]. Onset and exacerbation were found to be strongly connected with stressful life events and anxiety[18]. Psychotherapy studies of AD patients reported improvement in anxiety level and skin condition after psychotherapy[5].

This study was done to assess anxiety and dermatology life quality in children and adults with AD in our locality using Arabic versions of [C] DLQI and anxiety inventory. Our AD patients had significantly lower dermatologic life quality (DLQ) and higher anxiety index in both children and adults groups compared to the control groups. These results are consistent with reports from other countries[3,7,13]. Adult patients had significantly higher severity score and anxiety index than children. The higher anxiety index among adults may be related to the different reaction to eczema in adults or may be due to daily life stresses to which adults are usually exposed and not faced by children.

In both groups of our patients (adults and children) DLQI (CDLQI) showed a significant positive correlation with both severity score and anxiety index. This ensures that the dermatology life quality of the patients is related to both the severity of the skin condition and the anxiety associated with illness as reported in a previous study[13]. On the other hand, no correlation was found

between severity of AD and anxiety index, and this also agreed with Ginsburg et al. (1993)[4] and Linnet and Jemec, (1999)[13] and Rabung et al.(2004)[19]. This suggests that the experience of anxiety and the resources to manage it vary in individuals and not solely related to the severity of eczema[4].

The anxiety level and severity score of eczema were significantly related to different items of the DLQI explaining why they are both correlated with DLQI but not with each other. In children group, severity of eczema was related primarily to symptoms and feelings, leisure time activities and treatment, while in adult group, it was primarily related to symptoms and feelings, daily activities and treatment. The anxiety index in children was primarily related to items concerned with personal relationships, while in adults it was primarily related to personal and sexual relationships and leisure time activities. These results indicated that items related to practical care and management are more related to the severity of eczema, while the items related to intimacy and body exposure are more related to anxiety. In children group, both severity of AD and anxiety were strongly related to sleep difficulties indicating that sleep disturbances may be the result of two synergetic factors, namely itching and anxiety.

The fact that severity of the skin condition and anxiety of our patients contribute independently to the impairment of DLQI (and CDLQI) emphasizes the importance of the psychological treatment in addition to the standard dermatological treatment in the treatment of AD. Both lines of therapy may act synergetically to improve the skin condition which is reflected by improvement of DLQ as the results of previous studies suggest[5].

Conclusion:

Our work confirms that AD has an adverse effect on patient's quality of life and associated with high anxiety level. Both the severity of the skin condition and the anxiety associated with the illness, act independently to produce a synergetic impairment of dermatological life quality. These results underscore the importance of proper psychological assessment in the treatment of AD patients in association with standard dermatological therapy. In addition, these findings may imply that the DLQI could be used as an extra measure of disease assessment in clinical practice and research studies. Finally, we recommend country specific programs to make the health care system, families and schools more aware of AD and its associated problems, and possible solutions, including psychosocial intervention.

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