

Atopic dermatitis and mother-child interaction: a comparative study of 48 dyads

Dermatite atopique et interaction mère-enfant: étude comparative de 48 dyades

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RÉSUMÉ

Introduction: Les facteurs psychologiques et l'environnement familial peuvent jouer un rôle dans la pathogénie et la persistance des symptômes de la dermatite atopique (DA). L'objectif de notre étude était d'évaluer les interactions entre les mères et leurs enfants souffrant de DA et de rechercher la présence de dépression et d'anxiété maternelles.

Méthodes: Un échantillon de 24 enfants atteints de DA et de leurs mères et 24 dyades témoins appariés ont participé à l'étude. La dépression maternelle et l'anxiété ont été évaluées à l'aide de l'Inventaire abrégé de la dépression de Beck (BDI) et l'échelle d'évaluation de l'anxiété de Hamilton (HAM-A). L'interaction mère-enfant a été évaluée par enregistrement vidéo et par des scores établis après analyse de la vidéo: M-score pour l'attitude de la mère envers l'enfant et C-score pour le comportement de l'enfant.

Résultats: les mères du groupe DA ont affiché des scores significativement plus élevés sur le HAM-A, mais pas sur le BDI. L'analyse de l'enregistrement vidéo a révélé une différence significative dans les scores M entre les deux groupes, mais aucune différence dans les scores C. Le score M a été corrélé à l'anxiété de la mère.

Conclusion: Notre étude a révélé des arguments en faveur d'une perturbation de l'interaction mère-enfant dans le groupe DA notée du côté de la mère, avec plus de symptômes d'anxiété de la mère que le groupe témoin. Nos résultats suggèrent la nécessité d'un soutien psychologique pour les mères d'enfants atteints de DA.

Mots-clés

Dermatite atopique; Interaction mère-enfant; Anxiété; Dépression.

SUMMARY

Background: Psychological factors and family environment may play a role in the pathogenesis and the persistence of atopic dermatitis (AD). The aim of our study was to evaluate the interactions between mothers and their children suffering from AD and to look for the presence of maternal depression and anxiety.

Methods: A sample of 24 children with AD and their mothers and 24 matched control dyads participated in the study. Maternal depression and anxiety were assessed using the Beck Depression Inventory-short form (BDI) and the Hamilton Anxiety Rating Scale (HAM-A). The mother-child interaction was evaluated by video recording, and through scores established after analyses of the video: M-score for the mother's attitude towards the child and C-score for the child's behavior.

Results: AD group mothers showed significantly higher scores on the HAM-A, but not on the BDI. The analysis of the video recording conveyed a significant difference in M-scores between the two groups but no difference in C-scores. M-score was correlated with the mother's anxiety.

Conclusion: Our study found evidence in favor of a disturbance of the mother-child interaction in the case of AD, noted on the mother's side, and more anxiety in AD group mothers than in the control group. Our findings suggest the need for psychological support for mothers of children suffering from AD.

Key- words

Atopic dermatitis; Mother-child interaction; Anxiety; Depression.

Atopic dermatitis (AD) is a relatively common inflammatory disease of childhood. Its prevalence within the pediatric population has increased during the past three decades to currently 15% to 20% (1). However, studies in certain developing countries like Tunisia found a prevalence of less than 1% (2, 3). The main symptom of AD is itchiness, resulting in damage to the skin due to scratching of the afflicted area.

Several factors are involved in the genesis and exacerbation of AD: genetic, environmental, and psychological factors; some authors underlined the relationship between stress, anxiety and immune dysregulation in AD (4, 5). Moreover, there seems to be a link between stress, family environment, styles of family interaction and symptom severity in children with AD (6). A recent study showed that maternal post partum depression increased the risk of childhood AD (7).

The relationship between early parent-child interaction and chronic disorders in infants seems to be of particular importance, but few studies have been conducted in this area (8-12). Anxiety, depression or other emotional states in the parents can influence the quality of parent-child interactions (13). Similarly, the behavior and disorders of the child may interfere with the parent-child relationship.

The caregiver-child interaction has been reported as a reciprocal process with each partner influencing the other (14). Disturbance of the parent-child relationship may be due to either partner. It may be due to the child being unrewarding, little smiling and often crying, as noted by a study that explored the perception of the temperament of the AD infant by their mother (8). On the parent's side, exhaustion due to the child's disease, negative affectivity such as depression, guiltiness, anxiety may negatively interfere with the parent-child interaction.

Studies on parental characteristics and educative style in AD children yielded contradictory findings. A study by Ring and Palos, exploring several aspects of the parent-child relationship in AD, suggests that mothers of atopic children are less "spontaneous", more "under control", "distant" and less "emotional", as well as "stricter" in their educational approach, compared to controls (9, 10). However, a replication study with a larger sample size failed to confirm these findings, and a study on psychosocial adjustment in preschool children with AD reported positive affective responses towards the child and even maternal permissiveness (15). Pauli-Pott et al reports in her study a more "anxious overprotectiveness" but not more "rigidity" in child rearing attitudes of mothers of AD children compared to controls (8).

According to several studies, rearing a child with AD might not only influence educative style, but puts enormous strain on the parents (8, 11, 16). The study by Manzoni shows that anxiety and depression were observed in 36% of caregivers of patients with AD (17).

AIM

The aim of our study was to examine the differences in interaction between dyads of mothers and their children suffering from AD and healthy dyads and to explore anxiety and depression in mothers.

METHODS

We conducted a cross-sectional case-control study between February and June 2010. The local ethics committee approved the study. All the mothers who participated in the study provided their consent after being informed of the purpose and the conduct of the study.

Participants

A total of forty-eight mother-child dyads participated in the study. We included twenty-four children with AD monitored in the department of dermatology at Charles Nicolle Hospital in Tunis, Tunisia. Experienced dermatologists confirmed the AD diagnosis according to the criteria established by Hanifin and Rajka (18). As control subjects, we recruited twenty-four mother-child dyads from a maternal and child health center in the district of Tunis, where vaccination and routine examination of children are performed. All participating children were aged less than 36 months. For the index cases, we excluded children with other non-atopic conditions associated with AD. Healthy control children had to be free of chronic diseases especially atopic disease and respiratory disease. The control subjects were matched according to age and sex.

Assessment and Procedure

The assessment was conducted in one session which consisted of two parts: 1) a video recording of the mother-child dyad, 2) an interview with the mother also comprising the administration of rating scales to the mother. Two child and adolescent psychiatrists conducted interviews and provided interpretations of the video.

The dermatologist was asked to complete an anamnestic questionnaire about the AD comprising localizations of eczematous lesions, signs of pruritus and course of the disease. AD severity was assessed by SCORAD (19). We considered AD to be mild when the SCORAD score was lower than 20, moderate when SCORAD was between 20 and 39, and severe when the SCORAD score was 40 or more.

The video recording of the mother-child dyad took place during the consultation with the dermatologist for the AD group and during the routine medical consultation for the control group. At the end of the consultation, mothers were asked to apply a neutral moisturizer cream to the body of their children. During the application of the cream, mother and child were filmed for three minutes. The forty-

eight video analyses were performed separately by two child and adolescent psychiatrists (A.B. and E.F.J.) who were specially trained on the subject, and one of whom is specialized in infant psychiatry. The raters of the videos were blinded regarding the groups (AD versus controls). The videos were analyzed according to a rating grid developed by the authors. In case of discrepancy between the two raters, the video was revisited and analyzed a second time by the two raters together. The rating grid contained two items for reaction and attitude of the mother and the baby during the medical examination. The baby's reaction was assessed according to: "no reaction", "seeks interaction with the mother", "seeks interaction with the doctor", "anxious about the examination" or "other reactions". The mother's reaction was assessed according to "especially interested in the medical examination" or "interested in maintaining contact with the child".

For the items concerning the application of the cream, we established two scores: the first regarding mother's attitude towards the child ("M-score") and the second regarding the child's behavior ("C-score"). The M-score varies from 0 to 8: a higher score indicating an inadequate attitude of the mother within the dyad. The C-score varies between 0 and 6, a higher score indicating a distress reaction of the child (Appendix). We noted the item characteristic or category, which was exhibited by the mother or by the child approximately 50% or more of the video recording time. The internal consistency of both Mother's attitude including mother items and Child Behavior including child items was measured by Cronbach's alpha. It was 0.85 for Mother's attitude and 0.47 for Child Behavior.

The interview was conducted with the help of a structured questionnaire. It contained data on socio-demographic characteristics, antenatal and perinatal period, psychomotor development of the child, duration of breastfeeding, child's sleep, and type of childcare and medical history of each parent. All mothers were then screened for depression and anxiety using the Beck Depression Inventory – short form (BDI) in its Tunisian-Arabic version and the Hamilton Anxiety Rating Scale (HAM-A) translated into Tunisian Arabic (20). The short form of the BDI consists of 13 items, each one scored from 0 to 3, indicating increasing depressive symptom severity. The HAM-A includes 14 items, comprising psychological and somatic symptoms, each one rated from 0 to 4. It evaluates the present and the past week's symptoms (20).

Statistical analysis

Statistical analyses were conducted using the Statistical Package for Social Sciences Version 18. Analyses compared the 24 dyads with AD children with the 24 control dyads. Chi-square test was used to compare qualitative variables. Quantitative variables were

compared by the t test of Student. Pearson correlation analysis was carried out to explore the associations between quantitative variables. We established the level of significance at $\alpha=0.05$.

RESULTS

The socio-demographic characteristics of the two groups are summarized in Table 1. No significant differences for the general characteristics between the two groups were found.

Table 1: Socio-demographic characteristics of dyads with AD child and controls

	Dyads with AD child n=24	Control dyads n=24	Analysis p value
<i>Child's age (months)</i>			
mean, SD, range	17.17 (8.70), 5 to 36	16.08 (9.01), 5 to 36	
<i>Gender</i>			
Male	10	10	
Female	14	14	
<i>Mother's age (years)</i>			NS
mean, SD, range	33.04 (5.85), 23 to 42	31.08 (5.75), 19 to 45	
<i>Father's age (years)</i>			
mean, SD, range	37.50 (5.50), 28 to 50	38.87 (6.84), 27 to 54	
<i>Sibling rank</i>			NS
Eldest	2	1	
Younger	15	12	
Only child	6	11	
Other rank	1	0	
<i>Type of childcare</i>			NS
Mother only	11	19	
Grandmother or aunt	7	5	
Nurse or nursery	6	0	
<i>Educational level of the mother</i>			NS
Illiterate	1	5	
Primary education	13	11	
Secondary education	7	6	
Higher education	3	2	
<i>Educational level of the father</i>			NS
Illiterate	0	1	
Primary education	11	7	
Secondary education	11	16	
Higher education	2	0	

NS: non significant

We found a history of asthma and bronchiolitis in three children with AD out of 24. Mothers of children with AD had a significantly increased personal history of physical diseases ($p<0.01$), amongst them nine cases of allergy and asthma. The mothers of the control subjects had no history of atopic disease or skin disease. Medical history but no atopic disease was found in five fathers of the clinical group and four fathers of the control group without differences between the two groups. The parents in the two groups did not report any history of psychiatric illness. The results concerning pregnancy, perinatal period and child development are summarized in Table 2.

Table 2: Pregnancy, perinatal period and child development

	Dyads with AD child n=24	Control dyads n=24	Analysis p value
Desired pregnancy	19	22	NS
Planned pregnancy	13	18	NS
Pregnancy			NS
Uneventful pregnancy	18	16	
Gestational diabetes	3	2	
Toxemia of pregnancy	0	5	
Other pathology during pregnancy	3	1	
Sympathetic signs	15	13	NS
Delivery			
Normal delivery	21	15	p=0,04
Cesarean delivery	3	9	
Neonatal hospitalization	3	2	NS
Breast-feeding	21	23	NS
Duration of breast-feeding (month average, SD)	7.47 (6.59)	8.83 (6.57)	NS
Infant sleep disturbance	2	3	NS
Co sleeping	18	12	NS
Normal psychomotor development	24	24	
Normal language development	24	24	
History of early separation of mother- child	2	2	NS

NS: non significant

There were no significant differences between the two groups regarding the mothers' desire for pregnancy, the course of pregnancy, the perinatal period, breastfeeding and its duration, the child's sleep and child development. As to severity of AD defined by SCORAD, 17 children had moderate and seven children had mild AD. The mean SCORAD score was 23.15 (standard deviation 7.32; ranges from 8.8 to 38.3). During medical examinations, reactions and attitudes of the mothers were significantly different between the two groups. Mothers of AD children were more interested in the medical examination, whereas mothers of healthy children usually kept their focus on their children (19/24 vs 5/24) ($p<0.01$). The child's reactions were also significantly different between the two groups ($p<0.001$). Thus, anxiety was found in 11/24 AD children versus 1/24 children in the control group. Seeking interaction with the mother and/or the examiner was found in 7/24 AD children versus 19/24 controls, and no reaction was observed in 6/24 AD children versus 4/24 controls. Comparison of M-scores between the two groups showed a significant difference ($p<0.001$), whereas there was no significant difference between the C-scores of the two groups (Table 3).

Table 3: Results of M-score, C-score, Beck Depression Inventory and Hamilton Anxiety Rating Scale

	Dyads with AD child n=24		Control dyads n=24		Analysis p value
	Mean	Standard deviation	Mean	Standard deviation	
M-score	5.54	1.95	1.87	1.94	0.000
C-score	3.50	1.84	2.66	1.52	0.094
Beck Depression Inventory	7.58	5.42	4.83	4.83	0.070
Hamilton Anxiety Rating Scale	9.21	6.40	5.29	4.56	0.019

There was no significant difference in depression scores between the two groups (Table3). However, mothers of the AD group exhibited considerably more anxiety symptoms than mothers of the control group ($p<0.01$) (Table3).

Table 4: Correlations between HAM-A score, BDI score and SCORAD with "M-score" and "C-score"

	M-score	C-score	SCORAD	BDI score	HAM-A score
M-score					
Pearson Correlation	1	0.38	-0.04	0.18	0.41
Sig.(2-tailed)		0.010	0.850	0.210	0.004
N	48	48	24	48	48
C-score					
Pearson Correlation	0.38	1	-0.01	0.29	0.32
Sig. (2-tailed)	0.007		0.947	0.041	0.026
N	48	48	24	48	48
SCORAD					
Pearson Correlation	-0.04	-0.01	1	0.10	0.26
Sig. (2-tailed)	0.856	0.947		0.634	0.223
N	24	24	24	24	24
BDI score					
Pearson Correlation	0.18	0.29	0.10	1	0.55
Sig.(2-tailed)	0.214	0.041	0.634		0.000
N	48	48	24	48	48
HAM-A score					
Pearson Correlation	0.41	0.32	0.26	0.55	1
Sig. (2-tailed)	0.004	0.026	0.223	0.000	
N	48	48	24	48	48

Both M and C-scores were significantly positively correlated with the HAM-A (with respectively $r=0.41$, $p<0.01$ and $r=0.32$, $p<0.05$). C-scores were also correlated to BDI score ($r=0.29$, $p<0.05$). No significant correlation was found between M-scores and BDI and between M and C-scores and the SCORAD (Table 4).

DISCUSSION AND CONCLUSIONS

The important finding of our study is the clear difference in the quality of the mother-child interaction between the AD and the control group, during medical examination as well as during application of the cream. Indeed, mothers of AD children show impaired skin-to-skin contact, less eye contact, and less vocalizations with their children. To our knowledge, this is the first Tunisian study examining the mother-child-interaction in the context of chronic disease and the mental health of the parents.

Our results showed that mothers of AD children had significantly more anxiety but not significantly more depressive symptoms compared to mothers of healthy children. Our findings confirm the results of the few studies conducted in this area and in which mothers of AD children exhibit high levels of anxiety (8, 17). In

Appendix: M-Score and C-Score rating of the video recording during the application of the cream

M-Score	1-	Mother-child distance and touch		
		Adequate: the mother varies her distance depending on the needs of the application and touches appropriately with her hands	0	
		Inadequate: the mother touches the child with her fingertips or she's too close to the child, often slumped on the examining table	1	
	2-	Mother's facial expression		
		Smiling	0	
		Neutral	1	
	3-	Anxious or loathing	2	
		Research by the mother of the child's look		
		Frequent	0	
	4-	Occasional	1	
		Absent	2	
		Maternal vocalization		
	5-	Yes	0	
		No	1	
		Sensitivity of the mother to baby's signals		
	C-Score	1-	Appropriate sensitivity	0
			Some sensitivity	1
No sensitivity			2	
Child's reaction				
2-	Pleasure	0		
	Neutral	1		
	Marked by anxiety	2		
	Research by the baby of the mother's look			
3-	Frequent	0		
	Occasional	1		
	Absent	2		
	Cries of the baby during application			
		Absent	0	
		Occasional	1	
		Frequent	2	

comparison with previous studies, we did not find an association between depression and mother's behavior(8, 17). This is probably due to lack of power.

Two recent studies show links between maternal stress at preconception and AD risk at 12 months as well as maternal stress and anxiety at delivery, pointing to a developmental contribution to the occurrence of AD (21, 22). A systematic review suggests a relationship between maternal stress during pregnancy and atopic disorders in the child (23).

The high frequency of anxiety symptoms in the AD mothers group of our sample might be explained by feelings of uncertainty and negative anticipation about the further course of the illness, guiltiness for having transmitted a genetic predisposition to the child, grief about the external appearance of the child, which may be unattractive due to the skin lesions, or the increased needs of the child for care and parental involvement (8). A recent study found that mothers of AD children exhibited less affection and more rejecting attitudes towards their child (24). Another study with 242 mothers and their infants with AD showed that higher maternal controlling behaviors and unresponsiveness predicted greater odds of AD (25).

The level of mother's anxiety was significantly correlated to both M and C-score. The presence of anxiety symptoms in the mothers of AD children may influence

their behavioral interactions with the child. In our study, the inappropriate maternal interaction with the child in the AD group might therefore be explained by the significantly elevated levels of anxiety in AD mothers.

The disturbance in the parent-child-interaction could also be caused by the child suffering from AD. Indeed, there is a high risk that a chronic illness like AD might limit or alter the children's communicative behaviors and impact on the child's personality. In our study, the AD children showed more distress and less interaction seeking during the medical examination, but we did not find a difference between AD and control group children during the application of the cream. This difference noted during the medical examination could be explained by the circumstances of the examination that might have been inherently more stressful to the AD children. The lower interaction seeking could be a response to the mother's low affective availability to the AD child during the examination, the mother being more interested in the medical examination than in the child. In the Pauli-Pott study, mothers characterized their infant suffering from AD as significantly less frequently positive and more frequently negative in its emotional behavior compared to the control group (8). Preschool children with AD exhibited more frequently behavioral symptoms, with a significant excess of dependency and clinginess,

fearfulness and sleep difficulty (15). A study by Cassibba et al on a group of 10 premature and 10 AD infants and a control group of 20 full term and healthy infants shows a high incidence of insecure infants in the clinical group (AD infant and premature infant) evaluated by the strange Situation Procedure (12). A study on 64 parent-child dyads with AD showed that parents of children with more severe AD were responding to difficult child behavior less appropriately, potentially impacting on illness management (26).

Given the cross-sectional design of our study, it is not possible to determine whether the disturbance in the mother-child relationship is a precursor or a result of the disease. Many studies have shown that the psychological development of the baby depends largely on positive and stable interactions (13). Given the context of our study, we hereby only illustrate the importance of touch: From a psychological point of view, skin stimulation helps with the development of body image and self-esteem (27). Several studies examining the infant's reaction to touch stimulation showed more smiling and vocalizing and less distress in infants who received touch from their mothers (28-30). Reduced maternal interaction with the child might increase the child's distress and lead to a less secure attachment, which in turn makes the child more vulnerable to stressors. Psychosocial stress and skin condition share a bidirectional relationship. Stress exacerbates AD, and the worsening of AD lowers the stress threshold (31). This means that there might be a higher risk for AD to persist when the mother-child interaction is disturbed.

Our study has the following limitations: The sample size was established empirically, without conducting a power

analysis. The observation took place during and after the medical examination, a situation probably more stressful for the AD group. The observation time during the application of the cream was relatively short. A longer observation time and the use of several cameras instead of a single camera would have improved the evaluation of the mother-child interaction. Although the raters of the videos were blinded regarding the group (AD versus controls), there was a risk that the children suffering from AD would be identified in the video given that the skin lesions might be apparent. Furthermore, the Arabic versions of the HAM-A and the BDI scale are not yet validated.

Future studies with larger sample sizes are needed to confirm our findings and to get a more in-depth view of the causality of the disturbed mother-child interaction. The objective would be to propose adequate psychological care to the parent-child dyads. Some observational case studies suggest that treatments aimed at improving the parent-child interaction improve both skin and behavioral symptoms (32, 33). Multidisciplinary care programs including support for parents of the affected children have shown to improve coping with AD and quality of life (34, 35).

In conclusion, the results of the present study provide evidence that the mother-child interaction is clearly disturbed and that maternal anxiety is more frequent in the case of the child suffering from AD. However, we could not determine whether the disturbance in the mother-child relationship was a precursor or a result of the disease. Our findings underline the need for psychological support for mothers of children with AD.

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