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Investigating and Comparing Child Attachment, Mother's Emotion Regulation and Mother-child Relationships in Children with Asthma and Children with Eczema: A Cross-sectional Study

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ABSTRACT

Childhood asthma and eczema are common chronic diseases that significantly affect the health of children and parents. These children experience physical and psychosocial problems, including behavioral and emotional disturbances. This study was conducted to identify the psychological issues such as children's attachment, maternal emotion regulation, and child-parent relationship in children with autoimmune disorders, especially asthma and eczema.

This cross-sectional study included80 mother-child pairs (40 with asthma and 40 with eczema) recruited from Yazd autoimmune clinics between 2022 and 2023. Exclusion criteria included additional physical or psychiatric illnesses in parents and parental drug addiction. Participants completed a demographic questionnaire and three validated questionnaires: Children's Attachment Questionnaire, Gross Emotion Regulation Strategies Questionnaire, and Pianta Mother-Child Relationship Questionnaire.

Results analysis and comparison showed that both the asthma and eczema groups have moderate levels of secure attachment with a 25% achieving favorable score. Emotion regulation showed very low desirability (up to 25% for its subscales). Geographical location had a slight but significant effect on attachment and emotion regulation. Scores of the Pianta mother-child relationship scale were generally positive. No significant effects were observed in relation to the child's gender, occupation, and educational status of the mothers.

This study found moderate levels of children's secure attachment and maternal emotion regulation in both groups and favorable mother-child relationships in children aged 5 to 12 years with asthma and eczema. Only a small percentage of children demonstrated secure attachment, reflecting existing research linking childhood illness to parental distress and impaired child development.

Keywords: Asthma; Attachment behavior; Atopic dermatitis; Child; Chronic disease; Emotions; Parent-child relations

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INTRODUCTION

Children with chronic physical illnesses are at an increased risk of developing psychological difficulties that, over time, significantly diminish their quality of life.[1] Among these illnesses, asthma stands out as a prevalent respiratory disorder characterized by episodic airway obstruction, wheezing, coughing, and shortness of breath.[2] Although traditionally conceptualized as a somatic disease, contemporary research underscores the central role of psychological factors-such as stress, emotion regulation, and family dynamics-in both the onset and course of asthma.[3,4] Children with asthma often present with internalizing symptoms, oppositional behaviors, hyperactivity, and anxiety, all of which complicate parental caregiving.[5,6] These behavioral challenges frequently result in educational conflicts and heightened parental stress, which can, in turn, exacerbate the child's asthma symptoms or even contribute to the disease's onset in genetically predisposed individuals.[7–9] Thus, effective management of pediatric asthma requires not only medical treatment but also attention to parenting practices and emotional regulation within the family system.[7,9]

Similarly, eczema (atopic dermatitis), which affects approximately 15% to 20% of children globally, constitutes a chronic condition with profound biopsychosocial implications.[10] Children with eczema suffer from persistent itching, pain, and sleep disturbances, which negatively impact mood, behavior, and psychosocial adjustment.[11,12] The caregiving burden experienced by parents of these children is both substantial and multifaceted. These individuals frequently report elevated stress levels, a diminished quality of life, and symptoms of anxiety and depression.[12,13] For instance, a large-scale study by Chong et al (2023) demonstrated that higher levels of psychological flexibility, self-compassion, and self-efficacy among parents of children with eczema were associated with better parental mental health and improved child outcomes.[14]

Attachment theory provides a useful framework for understanding these dynamics. In children, Secure attachment is associated with enhanced emotional intelligence, problem-solving abilities, and executive functioning, including empathy and emotional regulation.[15] However, chronic illnesses such as asthma and eczema can disrupt the parent-child bond and intensify parental stress, leading to sleep disturbances, impaired daily functioning, and negative parenting attitudes.[9,13,16] These circumstances may result in decreased parental sensitivity, increased rejection, and a reduced sense of competence in caregiving.[17–19]

Importantly, maternal characteristics-such as personality traits, capacity for emotional regulation, and attachment style-are known to influence the quality of the mother-child emotional bond.[20] Research using attachment-based interviews and observational methods indicates that maternal sensitivity is shaped by various factors, including maternal education, attachment representation, and socioeconomic status.[21,22] Additionally, maternal education level, employment status, and the child's developmental status significantly impact the child's social-emotional growth.[23] These findings highlight the necessity of evaluating both child and maternal psychosocial factors when examining the emotional development of children with chronic illnesses.

Furthermore, mothers of children with asthma or eczema often experience heightened vigilance, emotional exhaustion, and a chronic sense of uncertainty in managing their child's fluctuating symptoms.[6,11,13] These stressors may compromise consistent emotional availability and impair sensitive responsiveness-both of which are essential for the formation of secure attachment formation.[19,21] Additionally, inconsistencies in caregiving routines due to night awakenings, medication schedules, or unpredictable flare-ups may undermine children's autonomy and trust in the caregiving relationship.[12,18] Evidence also indicates that the quality of attachment and dyadic emotion regulation can mediate the relationship between maternal psychological wellbeing and children's behavioral adjustment.[15,20] Given the cumulative burden of chronic disease management, emotional distress, and relational disruptions, a nuanced comparative understanding of attachment patterns and maternal regulation capacities in both conditions is warranted.

Despite a growing body of research in this field, few studies have systematically compared child attachment, maternal emotion regulation, and the mother-child relationship between children with asthma and eczema-especially in middle-income countries. This gap in the literature is particularly significant given the rising prevalence of these diseases and their psychological impact on families. Therefore, the current study aims to explore the associations between maternal education, employment status, geographic location, and child gender with child attachment, maternal emotional regulation, and

the quality of the mother-child relationship in children aged 5 to 12 years diagnosed with asthma or eczema.

MATERIALS AND METHODS

In this cross-sectional study, 40 children aged 5 to 12 years with asthma and 40 with skin eczema, along with their mothers, were recruited from an autoimmune clinic in Yazd. Children or parents with other physical diseases, such as glandular, renal, hepatic, and cardiac psychiatric illnesses, were excluded from the study. Parental drug addiction was also an exclusion criterion. Furthermore, mothers who did not consent to continue their participation in the study were permitted to withdraw from the study at any time. This study, which was conducted from 2022 to 2023, Participants were first asked to complete a questionnaire and subsequently participated in an interview. The demographic questionnaire included questions about the mother's age, education, occupation, monthly family income, and place of residence (categorized as residing in the provincial center or outside the provincial center). Additionally, information about the child's age and gender. Then, all mothers were assessed using the Children's Attachment Questionnaire (KCAQ), Gross Emotion Regulation Strategies Questionnaire (ERQ; subscales: cognitive reappraisal and expressive suppression), and Pianta Mother-Child Relationship Questionnaire (subscales: favorable and non-favorable). The KCAQ score contains subscales measuring positive adaptive development, negative behavior, emotional response, and avoidance of attachment. The results were analyzed and compared between the two groups.

The Children's Attachment Questionnaire (KCAQ) consists of 20 questions designed to assess children's attachment during the pre-primary and primary school years across various dimensions, including positive adaptive development, emotional reactions, negative behaviors, and distancing from caregiver support. The validity and reliability of the KCAQ were examined by Soleimani et al (2014).[24] Another tool used in this study is the Gross Emotion Regulation Strategies Questionnaire (ERQ), which has 10 items divided into two subscales: reappraisal (6 questions) and suppression (4 questions). The reliability and validity of the ERQ were initially investigated by Hasani in 2012.[25] Additionally, the Pianta Mother-Child Relationship Questionnaire, which was developed by Pianta in 1994, was also used to assess the quality of mother-child relationship. This 30-question scale evaluates parents' perceptions of their relationship with their child, focusing on areas such as closeness, dependence, conflict, and overall positive interaction. This tool categorizes relationships as either favorable or unfavorable. Ashori et al have reported on the content validity of this questionnaire.[26]

RESULTS

Table 1 presents the demographic characteristics of the mothers and children. The maternal education level was similar in both groups; most mothers have a diploma to a Master's degree (72.5%). The results showed that 22.5% of mothers of the eczema group and 17.5% of the mothers of the asthma group were employed. Gender distribution of children showed that in the eczema group, 57.5% were female and 42.5% were male, and in the asthma group, 42.5% were female and 57.5% were male.

Attachment Style

Children with eczema obtained a mean score of 51.83±5.69 in the Children's Attachment Questionnaire (KCAQ), suggesting that secure attachment is not optimal, but moderately good. The highest score for positive adjustment development scores were among children of mothers with graduate diplomas to Master's degrees (25.0±4.09) as well as those residing in the provincial center (25.9±3.45). Mothers' education significantly influenced attachment scores, with children of more educated mothers achieving slightly higher scores. Children of working mothers (25.56±3.50) had slightly elevated scores compared to those of non-working mothers (24.55±4.70; however, this difference was not statistically significant. No notable differences were observed between boys and girls. Regarding negative behaviors, children of mothers with undergraduate education recorded the highest scores, though this finding was also significant.

Children residing outside the center scored higher (9.85±3.97) than those in the center (8.89±2.53). Additionally, children of non-working mothers (9.65±3.21) demonstrated slightly higher scores compared to those of working mothers (7.67±1.87). Boys exhibited more negative behavior than girls. Emotional response was not significantly influenced by gender, mother's work status, or location, although some differences were noted. Emotional response was highest among children outside the center, and children of non-

working mothers (11.8±3.56) scored higher than those of working mothers (10.78±3.76). Boys and girls had minimal differences. The highest avoidance of attachment scores was found among children of mothers with undergraduate education. Scores were lower in children of working mothers (6.67±1.93) compared to non-working mothers (7.55±2.93), with boys (7.78±2.53) scoring higher than girls (7.0±2.91). Overall scores showed no significant differences. The highest total mean scores were in children of highly educated mothers and those in the center. Children of non-working mothers (52.1±6.20) scored higher than those of working mothers (50.8±3.45). Boys scored higher overall than girls (Table 2).

Children with asthma achieved an average score of 53.08±5.29 on the KCAQ, indicating relatively moderate levels of secure attachment. Regarding positive adjustment development, children of mothers with an undergraduate education attained higher scores higher (26.2±1.48) compared to those with higher degrees (25.0±3.38, 25.83±2.78). Furthermore, children outside the center scored slightly higher (25.46±2.63) than those in the center (25.2±3.35). Children of working mothers demonstrated notably higher scores in positive adjustment development compared to those of non-working mothers (26.0±2.76 vs 25.15±3.19). No significant differences were observed between genders. In terms of negative behavior, children whose mothers held a Master's degree scored slightly lower (9.3±2.42) than those with an undergraduate degree (9.6±1.34). Children outside the center scored higher (10.0±3.39) than those in the center (9.4±2.30). Non-working mothers had children with higher scores (9.79±2.81) than working mothers (8.7±1.79), and girls had higher scores than boys (Table 3).

Children of mothers with an undergraduate degree showed higher emotional response scores than those whose mothers possessed Master's or graduate diplomas. Children residing outside the center scored slightly higher (10.15±2.26) in emotional responses than those in the center (11.6±2.56), and no significant differences were found between children of non-working (11.1±2.64) and working mothers (11.0±2.08). Additionally, girls displayed higher emotional response scores than boys. Avoidance of attachment was observed to be non-significantly higher among children with undergraduate-degree mothers. Furthermore, children of non-working mothers scored higher in avoidance of attachment (7.21±6.82) than those of working mothers. In this category, boys scored higher than girls. Overall, children of mothers with an undergraduate degree scored higher (55.6±2.70) than those with higher degrees (54.5±5.92, 52.3±5.44). Location, mother's occupation, and gender had no significant impact, though children outside the center and girls scored slightly higher.

The evaluation of the Gross Emotion Regulation Strategies Questionnaire (ERQ), as presented in Table 4, indicates that mothers of children with eczema generally exhibit moderate levels of emotion regulation, with an average score46.83±11. Notably, the data reveal no statistically significant differences in ERQ scores when considering variables such as gender or working mother status. However, mothers who live outside the province center demonstrated slightly higher scores compared to those who live in the center. Mothers with a bachelor's degree to a Master's degree scored better levels of emotion regulation than mothers with other educational levels, suggesting that maternal education level can potentially influence emotion regulation skills in mothers of children with eczema.

Table 1. The demographic characteristics of the mothers and children.

Education	Eczema (count, (%))	Asthma (count, (%))
Undergraduate	5 (12.5%)	5 (12.5%)
Graduate diplomas to Master's degree	29 (72.5%)	29 (72.5%)
Master's degree to upper	6 (15%)	6 (15%)
Working Mother		
Yes	9 (22.5%)	7 (17.5%)
No	33 (77.5%)	33 (82.5%)
Child gender		
Female	22 (55%)	17 (42.5%)
Male	18 (45%)	23 (57.5%)

Table 2. The Children's Attachment Questionnaire (KCAQ) subscales in children with eczema.

Dimensions	Mother education			Geographical location		Working mother		Child gender		Total (Mean±SD)	*p-values*
	Undergraduate (Mean±SD)	Graduate diplomas to Master's degree (Mean±SD)	Master's degree to upper (Mean±SD)	Center of the province (Mean±SD)	Outside the Center (Mean±SD)	Yes (Mean±SD)	No (Mean±SD)	Girl (Mean±SD)	Boy (Mean±SD)		
Positive adjustment/ development	23.4±5.03	25.0±4.09	24.83±6.11	25.9±3.45[a]	22.38±5.39	25.56±3.50	24.55±4.70	25.0±4.51	24.5±4.46	24.78±4.44	.860
Negative behavior	9.8±2.95	9.0±2.59	9.67±5.24	8.89±2.53	9.85±3.97	7.67±1.87	9.65±3.21	8.95±2.31	9.5±3.82	9.2±3.05	.925
Emotional reactivity	11.6±3.13	11.66±3.40	11.17±5.23	11.3±3.23	12.15±4.31	10.78±3.76	11.8±3.56	11.36±3.49	11.8±3.77	11.58±3.58	.680
Distancing from caregiver support	9.6±4.61	7.14±2.10	6.5±3.27	7.3±2.81	7.46±2.69	6.67±1.93	7.55±2.93	7.0±2.91	7.78±2.53	7.35±2.74	.316
Total	50.4±3.70	52.0±5.18	52.17±6.67	52.11±5.30	51.23±6.62	50.8±3.45	52.1±6.20	51.18±5.66	52.6±5.79	51.83±5.69	.682

Significant difference between groups (*p-value*=.009). KCAQ: Children's Attachment Questionnaire; SD: standard deviation.

Table 3. The Children's Attachment Questionnaire (KCAQ) subscales in children with asthma.

Dimensions	Mother education			Geographical location		Working mother		Child gender		Total (Mean±SD)	*p*
	Undergraduate (Mean±SD)	Graduate diplomas to Master's degree (Mean±SD)	Master's degree to upper (Mean±SD)	Center of the province (Mean±SD)	Outside the Center (Mean±SD)	Yes (Mean±SD)	No (Mean±SD)	Girl (Mean±SD)	Boy (Mean±SD)		
Positive adjustment development	26.2±1.48	25.0±3.38	25.83±2.78	25.2±3.35	25.46±2.63	26.0±2.76	25.15±3.19	25.2±2.53	25.3±3.52	25.30±3.10	.802
Negative behavior	9.6±1.34	9.66±2.94	9.3±2.42	9.4±2.30	10.0±3.39	8.7±1.79	9.79±2.81	10.1±3.21	9.2±2.19	9.60±2.67	.421
Emotional reactivity	12.0±1.58	10.79±2.74	11.83±1.94	11.6±2.56	10.15±2.26	11.0±2.08	11.1±2.64	11.4±2.26	10.9±2.74	11.10±2.53	.959
Distancing from caregiver support	7.8±3.03	7.0±2.59	7.5±2.58	6.8±2.51	7.92±2.69	7.0±0.0	7.21±6.82	6.6±2.87	7.57±2.35	7.18±2.59	.746
Total	55.6±2.70	52.3±5.44	54.5±5.92	52.85±5.34	53.5±5.39	52.7±3.94	53.15±5.59	53.1±5.89	53.0±4.95	53.08±5.29	.210

KCAQ: Children's Attachment Questionnaire; SD: standard deviation.

Table 4. Gross Emotion Regulation Strategies Questionnaire (ERQ) subscales in the mothers of children with eczema.

Dimensions	Mother education			Geographical location		Working mother		Child gender		Total (Mean±SD)	*p*
	Undergraduate (Mean±SD)	Graduate diplomas to Master's degree (Mean±SD)	Master's degree to upper (Mean±SD)	Center of the province (Mean±SD)	Outside the Center (Mean±SD)	Yes (Mean±SD)	No (Mean±SD)	Girl (Mean±SD)	Boy (Mean±SD)		
Cognitive reappraisal	36.2±6.01	29.93±6.93	30.67±4.54	29.96±6.99	32.62±5.98	28.11±7.78	31.61±6.30	30.77±6.65	30.89±7.00	30.83±6.72	.175
Expressive suppression	19.2±6.30	15.48±5.84	16.33±5.12	15.41±6.04	17.46±5.15	14.33±5.05	16.58±5.96	15.68±5.95	16.56±5.70	16.08±5.78	.501
Total	55.4±11.58	45.31±11.40	47.0±6.51	45.26±11.80	50.08±9.12	42.44±10.85	48.10±11.04	46.3±11.50	47.4±10.92	46.83±11.12	.253

ERQ: Gross Emotion Regulation Strategies Questionnaire; SD: standard deviation.

Mother Emotion Regulation

Mothers of children with asthma displayed a moderate level of emotion regulation, as measured by the ERQ. The average total ERQ score was 39.7±9.87. There were no significant differences in ERQ scores based on the sex of the child or the employment status of the mothers. However, a geographical difference emerged, with mothers living outside the province center showing slightly higher scores than those residing within the center. The results of the table indicate that mothers whose highest educational attainment is a diploma to a Master's degree have a better level of emotion regulation than those with undergraduate degrees or extends beyond a master's degree (Table 5).

Mother-child Relationship

The Pianta Mother-Child Relationship Scale scores showed a generally positive mother-child relationship among children with eczema, with an average score of 56.73±7.11, reflecting favorable interactions between mothers and their children. Furthermore, no significant differences in relationship scores were observed based on the child's gender, mother's working status, or geographical location. However, children whose mothers held graduate diplomas or Master's degrees had slightly more favorable mother-child relationships (57.4±6.44) compared to children of mothers with undergraduate degrees (55.6±11.73) or those whose mothers had Master's degrees and above (54.17±6.30) (Table 6).

In Table 7, the Pianta mother-child relationship scale evaluation showed that the mother-child relationship in children with asthma was generally positive and the average score was 52.45±5.51, which indicates favorable interactions. No significant differences were observed based on the gender of the child, mothers' working status, or geographical location. Based on the data, children whose mothers had a graduate diploma to Master's degree scored slightly more favorable mother-child relationships compared to children of mothers with undergraduate degrees or Master's degrees and above.

Comparison between Groups

The comparative analysis between the asthma and eczema groups revealed no significant differences in the child's attachment (both in the total score and in the subscales). Regarding emotion regulation strategies in the two groups, according to the results obtained, the overall emotion regulation strategy (*p-values*=0.003) and the expressive suppression subscale (*p-values*=0.001) were better in the mothers of the eczema group. Regarding the mother-child relationship, the conditions were favorable in both groups, but statistically, the eczema group had a better relationship between mother and child (*p-value*=0.004) (Table 8).

Table 5. Gross Emotion Regulation Strategies Questionnaire (ERQ) subscales in mothers of children with asthma.

Dimensions	Mother education			Geographical location		Working mother		Child gender		Total (Mean±SD)	*p*-values
	Undergraduate (Mean±SD)	Graduate diplomas to Master's degree (Mean±SD)	Master's degree to upper (Mean±SD)	Center of the province (Mean±SD)	Outside the Center (Mean±SD)	Yes (Mean±SD)	No (Mean±SD)	Girl (Mean±SD)	Boy (Mean±SD)		
Cognitive reappraisal	30.60±7.40	28.17±5.95	24.0±8.78	26.78±6.27	30.08±7.12	27.0±6.19	28.03±6.82	27.29±7.58	28.26±6.02	27.85±6.65	.286
Expressive suppression	11.80±4.91	11.97±4.93	11.83±7.25	10.30±3.23	15.31±6.77[a]	9.57±2.22	12.42±5.49	12.18±4.83	11.74±5.50	11.93±5.17	.882
Total	42.40±9.71	40.03±8.90	35.83±14.67	36.96±7.85	45.38±11.46[b]	35.14±6.33	40.67±10.28	39.9±10.70	39.57±9.46	39.7±9.87	.355

Significant difference between groups (*p-value*=0.000).
Significant difference between groups (*p-value*=0.059).
Gross Emotion Regulation Strategies Questionnaire; SD: standard deviation

Table 6. Pianta mother-child relationship in children with eczema.

Dimensions	Mother education			Geographical location		Working mother		Child gender		Total (Mean±SD)	*p-values*
	Undergraduate (Mean±SD)	Graduate diplomas to Master's degree (Mean±SD)	Master's degree to upper (Mean±SD)	Center of the province (Mean±SD)	Outside the Center (Mean±SD)	Yes (Mean±SD)	No (Mean±SD)	Girl (Mean±SD)	Boy (Mean±SD)		
Favorable relationship	55.6±11.73	57.4±6.44	54.17±6.30	56.2±7.72	57.8±5.75	56.78±5.01	56.7±7.68	55.8±7.84	57.8±6.14	56.73±7.11	.405
Unfavorable relationship	38.2±11.79	37.97±9.78	41.0±16.63	38.9±10.90	37.46±11.37	40.56±10.72	37.8±11.09	38.3±11.51	38.6±10.52	38.45±10.93	.974

SD: standard deviation.

Table 7. Pianta mother-child relationship in children with asthma.

Dimensions	Mother education			Geographical location		Working mother		Child gender		Total (Mean±SD)	*p-values*
	Undergraduate (Mean±SD)	Graduate diplomas to Master's degree (Mean±SD)	Master's degree to upper (Mean±SD)	Center of the province (Mean±SD)	Outside the Center (Mean±SD)	Yes (Mean±SD)	No (Mean±SD)	Girl (Mean±SD)	Boy (Mean±SD)		
Favorable relationship	54.2±5.07	52.07±5.47	52.8±6.67	51.8±5.43	53.8±5.64	50.43±5.09	52.9±5.57	52.4±5.78	52.48±5.42	52.45±5.51	.804
Unfavorable relationship	38.6±12.62	40.8±10.64	40.17±12.81	40.6±11.26	40.0±10.59	37.29±9.58	41.09±11.20	40.45±11.19	40.48±10.96	40.42±10.92	.937

SD: standard deviation.

Table 8. Differences in scores between children with asthma and eczema.

	Eczema (Mean±SD)	Asthma (Mean±SD)	*p-values*
Children's attachment questionnaire			
Total score	51.83±5.69	53.08±5.29	>0.05
Positive adjustment development	24.78±4.44	25.30±3.10	>0.05
Negative behavior	9.2±3.05	9.60±2.67	>0.05
Emotional reactivity	11.58±3.58	11.10±2.53	>0.05
Distancing from caregiver support	7.35±2.74	7.18±2.59	>0.05
Gross Emotion Regulation Strategies Questionnaire (ERQ)			
Total score	46.83±11.12	39.7±9.87	0.003
Cognitive reappraisal	30.83±6.72	27.85±6.65	>0.05
Expressive suppression	16.08±5.78	11.93±5.17	0.001
Pianta mother-child relationship			
Favorable relationship	56.73±7.11	52.45±5.51	0.004
Unfavorable relationship	38.45±10.93	40.42±10.92	>0.05

ERQ: Gross Emotion Regulation Strategies Questionnaire; SD: standard deviation.

DISCUSSION

This study was conducted with the aim of investigating attachment patterns of children, the emotion regulation strategies employed by mothers, and mother-child relationships among children aged 5 to 12 years who have been diagnosed with asthma and skin eczema. Overall, the findings indicated low to moderate favorable levels across near all three factors. The comparative analysis between the asthma and eczema groups revealed no significant differences in children's attachment scores, either in the aggregate measure or across the individual subscales.

The study's results regarding emotion regulation strategies revealed that mothers of children in the eczema group exhibited significantly superior overall emotion regulation. This difference was especially pronounced in the expressive suppression subscale, where mothers in the eczema group scored notably higher (*p*-values=0.001). Furthermore, analysis of the mother-child relationship indicated that, although both groups generally demonstrated positive interactions, the relationship was statistically significantly stronger in the eczema group. The results of the attachment questionnaire in both groups showed that only 25% of the children had a favorable attachment status, while the rest demonstrated either somewhat favorable or unfavorable attachment patterns. According to studies conducted on children with atopic dermatitis (AD), this condition adversely affects the psychosocial well-being of both the affected children and their parents, and these mothers showed higher levels of stress, depression, and burnout compared to mothers of healthy children. It is well established that parental psychological distress is s a significant factor influencing the quality of children's attachment.[27,28] In light of our study, which has obtained similar results in the context of childhood attachment, we can conclude that immune diseases in children exert a dual influence: firstly, they directly affect the psychological well-being of the children, thereby impacting their attachment; secondly, they may indirectly affect attachment by inducing psychological distress in parents, which in turn influences the parent-child attachment relationship

Furthermore, families of children with eczema reported lower levels of social support and higher maternal mental distress compared to families of children without eczema.[29] It is worth mentioning that our attachment scores were higher than the average obtained for 3- to 6-year-old children in Yazd. This difference could be due to the limited exposure of children to social gatherings in that study.[30]

A close examination of attachment dimensions among children aged 5 to 12 years revealed that only 17.5% of those diagnosed with eczema and approximately 25% of those with asthma exhibited secure attachment, as measured by positive adjustment developmental questions. Secure attachment, children use their parents as a safe base for exploration, as their physical needs are met, strengthening trust, and conversely, disruption and instability in this process may cause insecurity, subsequently manifesting as personal and social challenges. Findings indicate that parents who experience negative conflict and exhibit high levels of psychological distress can influence their child's behavior problems.[31] Given that both eczema and asthma worsen under stress,[32] high levels of stress experienced by parents and children significantly contributed to low secure attachment in our sample. Studies on sick children, including those with cancer exhibit a high degree of distress tolerance, their children tend to show better psychological adjustment and fewer behavioral problems. Illness may impair parents' emotional tolerance and contribute to their children's behavioral disorders.[33] Another study on students who experienced stress, depression, and fear has been shown less adjustment development in these children.[34]

Children who live in the center of a province exhibit a more secure attachment style than those living outside it. Factors such as parental neglect and unstable family conditions can lead children to feel that their parents are not committed to achieving goals.[32,35] In addition, cultural differences, extended family dynamics, socioeconomic status, income levels, and educational quality in kindergartens and schools-especially in larger cities-can significantly influence cognitive and social-emotional development.[36] However, none of the investigated factors (job status, education level, or mother's place of residence) had an effect on children with asthma.

Our study consistent with findings from two investigations conducted in Germany and the United States, highlighted an adverse indirect effect of asthma on stress through its impact on attachment.[16,37] When evaluating distancing from caregiver support, comparable results were found among children aged 4 to 6 years in Tabriz[30] and those aged 10 to 12years in Rasht,[38] although some studies have reported higher

scores.[39] Multiple factors influence caregiver avoidance and are challenging to examine individually. However, children with eczema exhibited behaviors similar to those without eczema, indicating that eczema does not have a significant effect on this particular aspect. This study highlights the lack of research in this area and emphasizes that children's reliance on caregivers affects not only their social-emotional well-being but also their physical health.[19]

Examining emotion regulation and its subcategories, cognitive reappraisal and expressive suppression have revealed a very low desirable level (up to 25%). Further, parents' behavior with their child's asthma and their children's anxiety state were investigated. This study found that parents of asthmatic children were more conservative and self-sacrificing than parents of children without asthma, although their parenting styles were broadly similar.[40] Other studies indicate that increased negative and critical behaviors from parents can occur as children's health conditions worsen.[41,42] Additionally, a study examining the relationship between maternal post-traumatic symptoms and children's emotion regulation disorders in trauma-exposed communities has confirmed that poor maternal emotion regulation contributes to children's difficulties in managing their own emotion. These findings emphasize the concept of relational emotion regulation, wherein a mother's emotional state influence on her child's emotional development and communication.[43]

In our study, factors such as the child's gender, the mother's occupation, and her education level did not show a statistically significant effect on the mother's emotion regulation. However, among children with asthma, residence was found to significantly influence this relationship, with increasing distance from the center appearing to be associated with improvement In a study that included children with asthma in Besat Hospital in Sanandaj, although age and gender did not affect the results, a significant relationship was found between the perceived quality of life of the child and their place of residence.[28] In addition, findings from the COVID study showed that family income and the mother's education level significantly affect the mother's behavior.[44]

Comparing the mean scores of parent-child relationships among children with eczema revealed that only 25% had a favorable relationship with their mothers, while this percentage was 22.5% among children with asthma. In 2015, Verkleij et al conducted a study on parental stress related to behavioral problems and disease severity in children with severe asthma. The study included 93 children with an average age of 13 years. Findings indicate that, although mothers do not show high levels of stress, increased parental stress is related to the severity of children's illness. It leads to greater levels of internalizing and externalizing behavior problems in children.[7] This study shows that even if the parental stress levels are not elevated, children's behavior and consequently, the child-parent relationship are affected due to the influence of the type of relationship between parents and children with immune-related diseases. Our study also points to the effect of these diseases on the mother-child relationship. To further elucidate the challenges in the mother-child interactions as a result of immune or infectious diseases, one can refer to studies on the impact of the COVID-19 pandemic (as an abnormal condition) on parent-child interactions. X and colleagues found that the stress and depression experienced by parents during quarantine led to fewer positive interactions and an increase in negative parenting behaviors, such as excessive strictness or leniency.[44] It is expected that chronic illnesses such as asthma and eczema, similarly disrupt these relationships.

Comparing the scores from each child's attachment questionnaires, the mother's emotion regulation assessments, and mother-child relationship questionnaires revealed no significant differences in attachment scores between children with eczema and those with asthma.

It important to consider the limitations of this study, including the small sample size and its geographical focus (Yazd province). Cultural and educational factors should also be considered, mainly since subscale scores for positive developmental adjustment and maternal emotion regulation differ between patients residing in the provincial center and those outside it. Since it is believed that the severity of the illness can affect parental behavior and parent-child relationships, this issue could be investigated in future studies. It should also be noted that parental relationships were not examined in this study, which could also be an interesting topic for future studies.

The study revealed moderate levels of children's secure attachment and maternal emotion regulation across both groups, along with generally positive mother-child relationships among children aged 5 to 12 years with asthma and eczema in Yazd province.

However, only a small proportion of the children exhibited secure attachment, aligning with previous research that associates childhood illness with increased parental distress and disruptions in child development. The place of residence of the participants affected some results, but the mother's occupation and education did not have a significant impact on the overall findings.

STATEMENT OF ETHICS

This research's ethical considerations were reviewed and approved by the Ethics Committee of Shahid Sadoughi University of Medical Sciences (ethical code: IR.SSU.MEDICINE.REC.1400.390). Written Consent was obtained from all participants, and mothers who did not consent to continue participating in the study were allowed to leave.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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DATA AVAILABILITY

Data would be available by emailing the correspond author.

AI ASSISTANCE DISCLOSURE

Not applicable.

REFERENCES

1. Glassgow AE, Wilder J, Caskey R, Munoz G, Van Voorhees B, Kim S. Mental health diagnoses among children and adolescents with chronic medical conditions in a large urban cohort. J Behav Health. 2020;9(4):1.
2. Bereda G. Bronchial asthma: etiology, pathophysiology, diagnosis and management. Austin J Pulm Respir Med. 2022;9(1):1085.
3. González-Freire B, Vázquez I, Pértega-Díaz S. The relationship of psychological factors and asthma control to health-related quality of life. J Allergy Clin Immunol Pract. 2020;8(1):197-207.
4. Stanescu S, Kirby SE, Thomas M, Yardley L, Ainsworth B. A systematic review of psychological, physical health factors, and quality of life in adult asthma. NPJ Prim Care Respir Med. 2019;29(1):37.
5. Keteyian SR, Leo HL. Parenting asthmatic children: identification of parenting challenges. Pediatrics. 2009;124 Suppl 2:S144-S.
6. Ferraro VA, Spaggiari S, Zanconato S, Traversaro L, Carraro S, Di Riso D. Psychological well-being of children with asthma and their parents. J Clin Med. 2024;13(17):5100.
7. Verkleij M, Van de Griendt EJ, Colland V, Van Loey N, Beelen A, Geenen R. Parenting stress related to behavioral problems and disease severity in children with problematic severe asthma. J Clin Psychol Med Settings. 2015;22:179-93.
8. Fang Y, Luo J, Boele M, Windhorst D, van Grieken A, Raat H. Parent, child, and situational factors associated with parenting stress: a systematic review. Eur Child Adolesc Psychiatry. 2024;33(6):1687-705.
9. Yamamoto N, Nagano J. Parental stress and the onset and course of childhood asthma. Biopsychosoc Med. 2015;9:7.
10. Langan SM, Mulick AR, Rutter CE, Silverwood RJ, Asher I, García-Marcos L, et al. Trends in eczema prevalence in children and adolescents: a Global Asthma Network Phase I study. Clin Exp Allergy. 2023;53(3):337-52.
11. Teasdale E, Muller I, Sivyer K, Ghio D, Greenwell K, Wilczynska S, et al. Views and experiences of managing eczema: systematic review and thematic synthesis of qualitative studies. Br J Dermatol. 2021;184(4):627-37.
12. Teasdale E, Sivyer K, Muller I, Ghio D, Roberts A, Lawton S, et al. Children's views and experiences of treatment adherence and parent/child co-management in eczema: a qualitative study. Children (Basel). 2021;8(2).
13. Lee HJ, Lee GN, Lee JH, Han JH, Han K, Park YM. Psychological stress in parents of children with atopic dermatitis: a cross-sectional study from the Korea National Health and Nutrition Examination Survey. Acta Derm Venereol. 2023;103:adv00844.

14. Chong YY, Kwan JY, Yau PT, Cheng HY, Chien WT. Roles of parental psychological flexibility, self-compassion, and self-efficacy in affecting mental health and quality of life in parents of children with eczema. Healthcare (Basel). 2023;11(20).
15. Cooke JE, Kochendorfer LB, Stuart-Parrigon KL, Koehn AJ, Kerns KA. Parent–child attachment and children's experience and regulation of emotion: a meta-analytic review. Emotion. 2019;19(6):1103.
16. Steinhausen HC, Schindler HP, Stephan H. Correlates of psychopathology in sick children: an empirical model. J Am Acad Child Psychiatry. 1983;22(6):559-64.
17. Juffer F, Bakermans-Kranenburg MJ, Van Ijzendoorn MH. Promoting positive parenting: an attachment-based intervention. London: Taylor & Francis; 2023.
18. Cassibba R, van Ijzendoorn MH, Bruno S, Coppola G. Attachment of mothers and children with recurrent asthmatic bronchitis. J Asthma. 2004;41(4):419-31.
19. Ehrlich KB, Miller GE, Shalowitz M, Story R, Levine C, Williams D, et al. Secure base representations in children with asthma: links with symptoms, family asthma management, and cytokine regulation. Child Dev. 2019;90(6):e718-28.
20. Bilge Y, Sezgin E. Anne ve çocuk duygu düzenleme arasındaki ilişkide annenin kişilik özelliklerinin ve bağlanma stillerinin aracı rolü. Anatolian J Psychiatry. 2020;21(3):310-8.
21. Posada GE, Trumbell JM, Lu T, Kaloustian G. The organization of attachment behavior in early childhood: links with maternal sensitivity and child attachment representations. Monogr Soc Res Child Dev. 2018;83(4):35-59.
22. Bailey HN, Bernier A, Bouvette-Turcot AA, Tarabulsy GM, Pederson DR, Becker-Stoll F. Deconstructing maternal sensitivity: predictive relations to mother-child attachment in home and laboratory settings. Soc Dev. 2017;26(4):679-93.
23. Wijirahayu A, Krisnatuti D, Muflikhati I. Kelekatan ibu-anak, pertumbuhan anak, dan perkembangan sosial emosi anak usia prasekolah. J Ilmu Keluarga Konsumen. 2016;9(3):171-82.
24. Soleimani H, Bashash L, Latifiyan M. Psychometric properties of the kinship center attachment questionnaire (KCAQ) of latency-aged for children. Iran J Psychiatry. 2014;9(2):112-20.
25. Mashhadi A, Hasani J, Mirdoraghi F. Factor structure, reliability and validity of Persian version of the cognitive emotion regulation questionnaire-children form (CERQ-KP). J Fundam Ment Health. 2012;14(55):59-246.
26. Ashori M, Afrooz GHA, Arjmandnia AA, Pormohammadreza-Tajrishi M, Ghobari-Bonab B. The effectiveness of positive parenting program (triple-P) on parental self-efficacy and mother-child interaction in children with intellectual disability. SSU J. 2015;23(5):489-500.
27. Hui VK, Chan CH, Fung YL, Chan CL, Luk MS. Efficacy of the integrative body–mind–spirit group intervention for improving quality of life in parent–child dyads adjusting to atopic dermatitis: protocol for a randomised controlled trial. BMJ Open. 2022;12(3):e059150.
28. Kilic N, Kilic M. Investigation of quality of life of patients with atopic dermatitis and quality of life, psychiatric symptomatology, and caregiver burden of their mothers. Children (Basel). 2023;10(9):1487.
29. Absolon CM, Cottrell D, Eldridge SM, Glover MT. Psychological disturbance in atopic eczema: the extent of the problem in school-aged children. Br J Dermatol. 1997;137(2):241-5.
30. Arshadi M, Valizadeh S, Babapour J, Shameli R. Comparison of the attachment situation of kindergarten and non-kindergarten preschools in Tabriz, 2011. J Nurs Educ. 2013;1(1):10-8.
31. Mellblom AV, Korsvold L, Ruud E, Lie HC, Loge JH, Finset A. Sequences of talk about emotional concerns in follow-up consultations with adolescent childhood cancer survivors. Patient Educ Couns. 2016;99(1):77-84.
32. Fearon R, Roisman GI. Attachment theory: progress and future directions. Curr Opin Psychol. 2017;15:131-6.
33. Firoozi M. Distress tolerance in mothers of children with cancer for predicting her parenting style and child's attachment behaviors: a cross-sectional study. Int J Cancer Manag. 2020;13(3):e102345.
34. Saeedi F, Aghdasi A. The relationship of three attachment styles with depression and anxiety in seventh and eighth grade female students. Women Fam Stud. 2018;10(40):165-89.
35. Bovenschen I, Lang K, Zimmermann J, Förthner J, Nowacki K, Roland I, et al. Foster children's attachment behavior and representation: influence of children's pre-placement experiences and foster caregiver's sensitivity. Child Abuse Negl. 2016;51:323-35.
36. Khodabakhsh M, Hashemi-Razini H, Nouri Ghasemabadi R. Structural model of social skills in children with learning disabilities based on attachment styles with the mediating role of academic self-efficacy. Child Ment Health J. 2021;8(1):1-13.

37. Mrazek DA, Casey B, Anderson I. Insecure attachment in severely asthmatic preschool children: is it a risk factor? J Am Acad Child Adolesc Psychiatry. 1987;26(4):516-20.
38. Simbar S, Hosseinkhanzadeh AA, Abolghasemi A. Hope for the future, attachment relationships, and emotional-behavioral problems in child labor. Q J Child Ment Health. 2019;6(3):51-65.
39. Salehi Shahrabi M, Shahrabi M, Heidari A, Ghaderi H. Role of attachment style in prediction of behavior of 3- to 6-year-old children. Eur Arch Paediatr Dent. 2020;21:647-56.
40. Sicouri G, Sharpe L, Hudson JL, Dudeney J, Jaffe A, Selvadurai H, et al. Parent-child interactions in children with asthma and anxiety. Behav Res Ther. 2017;97:242-51.
41. Schöbinger R, Florin I, Reichbauer M, Lindemann H, Zimmer C. Childhood asthma: mothers' affective attitude, mother-child interaction and children's compliance with medical requirements. J Psychosom Res. 1993;37(7):697-707.
42. Schöbinger R, Florin I, Zimmer C, Lindemann H, Winter H. Childhood asthma: paternal critical attitude and father-child interaction. J Psychosom Res. 1992;36(8):743-50.
43. Pat-Horenczyk R, Cohen S, Ziv Y, Achituv M, Asulin-Peretz L, Blanchard TR, et al. Emotion regulation in mothers and young children faced with trauma. Infant Ment Health J. 2015;36(3):337-48.
44. Uzun H, Karaca NH, Metin S. Assessment of parent-child relationship in COVID-19 pandemic. Child Youth Serv Rev. 2021;120:105748.