

Factors Associated with Infantile Eczema in Hangzhou, China

Yun-Ling Li, Ph.D.,* Lei Zheng, M.D.,* Hai-Yan Jin, M.D.,† Xia Xu, M.D.,*
and Li-Li Song, M.D.*

*Departments of *Dermatology and †Anesthesiology, Children's Hospital, School of Medicine, University of Zhejiang, Hangzhou, China*

Abstract: The removal of aggravating factors is important to reduce the severity of infantile eczema, but there are few studies on the assessment and identification of the aggravating factors in infantile eczema. Parents of children with infantile eczema ages 1 to 10 months ($N = 250$) were recruited. Parents were required to complete a questionnaire. Two hundred forty-two (96.8%) children had skin dryness, 80% bathed with soap or shower gel, 82% often perspired, 84.8% wore tight-fitting clothes, 80.8% dressed in five layers of thick clothing, 85.6% were in contact with wool or feathers, and 59.2% were exposed to sunlight (>20 minutes/day). Eczema severity was greater after vaccination in 20%. Two hundred thirty-five mothers avoided eating potential food allergens (e.g., milk, egg whites, and fish), but this failed to improve the severity of symptoms in 93.6% of the children. Thirty patients had Neocate as a substitute for cow's milk, which resulted in symptom severity improvement in 10%. Thirty children were given food allergens, which exacerbated symptoms in 13.3%. One hundred twenty-eight (51.2%) of the children were treated with corticosteroid ointment; 62.5% had the ointment applied for only 2 to 3 days, and 6.2% had the corticosteroid ointment applied to weeping lesions. The vast majority of parents did not know about the aggravating factors for infantile eczema. The results demonstrated a strong need for educational programs to help parents understand and control infantile eczema.

Eczema is a common skin disease in infancy, affecting 10% to 20% of children (1). The symptoms of itching, scratching, and sleeplessness can place a burden on the whole family (2). Studies have indicated that the environment has a significant effect on the exacerbation and severity of infantile eczema (3). Therefore, to control and reduce the severity of infantile eczema,

removal of these aggravators from the child's environment and the proper use of medicine are important.

Some studies report that educational programs are effective in treating and controlling eczema (4,5). Parental education is considered an important factor in the management of eczema (6,7). Nicol (8) reported that intractable eczema improves dramatically when

Address correspondence to Yun-Ling Li, Ph.D., Children's Hospital, School of Medicine, University of Zhejiang, 57 Zhugan Lane, Yanan Road, Hangzhou 310013, China, or e-mail: liyunling73@yahoo.com.

parental education and understanding are provided along with conventional treatment. Through education, parents learn about the aggravating factors for infantile eczema and can reduce recurrences and severity.

Before initiating education, doctors should assess the specific aggravating factors for infantile eczema and then design an education program. Few studies have included a clinical evaluation of aggravating factors for infantile eczema. Therefore, in an effort to reduce the severity of infantile eczema, we assessed and identified the aggravating factors for infantile eczema. The results will help provide educational support to parents to achieve a positive long-term outcome for eczema in their children.

METHODS

The survey was performed at the pediatric dermatology clinic of Children's Hospital at Zhejiang University School of Medicine, Hangzhou, China, from November 2010 to February 2011. Parents of children ages 1 to 10 months were recruited using a simple random sampling method. The ethical committee of Children's Hospital of Zhejiang University approved this study, and informed consent was obtained from all participants. A questionnaire was developed that included 20 questions about factors potentially influencing the development of infantile eczema. Each participant was required to complete the questionnaire. After participants had completed the questionnaire, a physician administered the same questionnaire to ensure that all questions had a response and to clarify any ambiguities. The questionnaire (see the Appendix) included questions on environment, allergic conditions, and medications used. All data were entered in SPSS version 12.01 for Windows (SPSS, Inc., Chicago, IL).

RESULTS

Characteristics of Patients

Table 1 shows the demographic characteristics of the 250 patients. A dermatologist clinically diagnosed all of them with infantile eczema on the basis of their medical history, clinical presentation, and physical examination results. The duration of disease of the patients was 1.95 ± 0.85 months; 45.6% had a positive family history of allergies. One hundred fifty-four (61.6%) of the patients were male. Of the 250 patients, 18.4% had mild eczema, 42% had moderate eczema, 30% had severe eczema, and 9.6% had intermittent eczema. The mothers of 60% of the patients had a college degree.

TABLE 1. *Characteristics of 250 Patients*

Characteristic	Value
Age, months, mean $\pm$ SD	3.68 ± 1.83
Sex, <i>n</i> (%)	
Male	154 (61.6)
Female	96 (38.4)
Highest education level of mother, <i>n</i> (%)	
< High school	54 (21.6)
High school	46 (18.4)
College degree	150 (60)
Graduate degree	0 (0)
Urban	205 (82)
Rural	45 (18)
Duration of disease, months, mean $\pm$ SD	1.95 ± 0.85
Duration of exacerbation, days, mean $\pm$ SD	15.78 ± 3.5
Disease severity, <i>n</i> (%)	
Mild	46 (18.4)
Moderate	105 (42)
Severe	75 (30)
Intermittent	24 (9.6)
Family history of allergy, <i>n</i> (%)	
Yes	114 (45.6)
No	136 (54.4)

SD = standard deviation.

Skin Dryness and Application of Moisturizer

Of the 250 children, 242 (96.8%) had skin dryness and roughness, with 140 (57.8%) having severe dryness (Table 2). Of the 250 children, only 154 (61.6%) used a moisturizer (61.7% used a moisturizing cream, 22.7% a moisturizing lotion, and 15.6% an oil). Of the 95 patients who used a moisturizing cream, 73.7% had it applied fewer than two times a day. Ninety-six (38.4%) did not use a moisturizer, because the parents worried about allergies (68.8%) or thought it was not necessary (31.2%).

Bathing Factors Affecting Infantile Eczema

Bathing with soap or shower gel was reported for 80% of the patients. Symptoms were exacerbated after bathing in 57.2%. Of the 250 children, 42.4% were bathed at a public bathing center, which exacerbated severity in 77.4%. Of the 250 children, 72% were bathed with the heat on, and 6% were bathed daily (Table 2).

Heat Factors Affecting Infantile Eczema

Of the 250 patients, 82% often perspired, 84.8% wore tight-fitting clothes, and 80.8% were dressed in five layers of thick clothing (Table 2). In the morning, the severity was worse upon awakening in 95.2%, and parents found

TABLE 2. Results of the Survey

Questionnaire	<i>n</i>	%
Skin dryness and roughness		
Yes	242	96.8
No	8	3.2
If “yes”		
Mild	14	5.8
Moderate	88	36.4
Severe	140	57.8
Use of moisturizer		
Yes	154	61.6
No	96	38.4
If “yes”		
Moisturizing cream	95	61.7
Frequency (per day)		
< 2 times	70	73.7
2–3 times	18	18.9
< 3 times	7	7.4
Moisturizing lotion	35	22.7
Oil	24	15.6
If “no”		
Worry about allergies	66	68.8
Not necessary	30	31.2
Using soap or shower gel		
Yes	200	80.0
No	50	20.0
Frequency of bathing (per week)		
< 2 times	173	69.2
2–4 times	44	17.6
5–6 times	18	7.2
Every day	15	6.0
Bathing with heat on		
Yes	180	72
No	70	28
Exacerbation after bathing		
Yes	143	57.2
No	107	42.8
Bathing at public bathing center		
Yes	106	42.4
Exacerbation after bathing at public bathing center	82	77.4
How many layers of thick clothing		
3	8	3.2
4	12	4.8
5	202	80.8
> 5	28	11.2
Often perspired		
Yes	205	82
No	45	18
Tight-fitting clothing		
Yes	212	84.8
No	38	15.2
Dressed in thermal underwear		
Yes	216	86.4
How many layers		
1	34	13.6
2	158	63.2
3	48	19.2
> 3	10	4.0
How many jackets		
1	37	14.8
2	185	74.0
3	28	11.2
Dressed in clothing when asleep	78	31.2
Thermal underwear or jacket	73	29.2
Thermal underwear and jacket	47	18.8
Sleeping bag	30	12

TABLE 2. Continued

Questionnaire	<i>n</i>	%
Exacerbation in the morning		
Yes	238	95.2
Contact with wool or feathers		
Yes	214	85.6
Wearing a cap		
Yes	187	74.8
Exposure to sunlight		
Yes	148	59.2
If yes, > 20 minutes per day)	94	63.5
Exacerbation after exposure to sunlight (> 20 minutes per day)	50	20
Worse symptoms after vaccination		
Feeding behavior		
Breastfeeding	115	46
Mixed feeding	90	30
Cow’s milk feeding	45	18
Neocate	30	12
Feel better	3	10
No change	27	90
Mother ate food allergens	15	6
Exacerbation after eating	2	13.3
Mother avoids food allergens	235	94
Feel better	15	6.4
No change	220	93.6
Added food allergens	30	12
Exacerbation after adding	4	13.3
Used corticosteroid ointment		
Yes	128	51.2
No	122	48.8
If “yes”		
How long, days		
2–3	80	62.5
3–4	32	25
> 4	16	12.5
If “no”		
Why not		
Fear of side effects	65	53.3
Deemed not necessary	57	46.7
Used on weeping lesions		
Yes	8	6.2

that the child was hot and perspiring, indicating that the body temperature of the child had risen overnight.

Other Environmental Factors Affecting Infantile Eczema

The results show that 85.6% of the children had contact with wool or feathers. As shown in Table 2, 59.2% were exposed to sunlight for more than 20 minutes/day, which aggravated symptoms in 94 (63.5%). Severity was exacerbated after vaccination in 50 children (20%).

Food Factors Affecting Infantile Eczema

In our study, 30 children had Neocate as a substitute for cow’s milk, but only 10% of the children experienced an improvement in symptoms. Fifteen mothers (6%) of

patients ate food allergens (cow's milk, eggs, soy, fish, shellfish, shrimp, crab), which exacerbated symptoms in 13.3% (2/15) of the children; another 235 mothers avoided eating food allergens, yet this did not result in an improvement in symptoms in 93.6% (220/235) of the children. Thirty children were given food allergens, which exacerbated symptoms in 13.3% of the children (Table 2).

Cortisone Ointment Treatment

For treatment, 51.2% used topical corticosteroid ointment, 62.5% for 2 to 3 days and 12.5% for longer than 4 days (Table 2). These results reflect that some mothers worried about the side effects of topical corticosteroid ointment, thus they stopped using topical corticosteroid ointment when they believed their children's symptoms had improved.

DISCUSSION

Eczema is an atopic condition linked to inherited and environmental factors. Doctors can promote the control and prevention of eczema by teaching parents about exacerbation factors and how to avoid them. Parents need to understand that eczema is likely to come and go intermittently if the child does not avoid all triggering factors.

In the survey described here, 60% of the parents of children with infantile eczema possessed a college degree but still lacked knowledge about aggravating factors for infantile eczema. Of the 250 children, 96.8% reported skin dryness and roughness despite the fact that some used moisturizer. Some children used lotion (which is not moisturizing), and moisturizing cream use was infrequent (which does not prevent drying). In addition, some parents used oil on their children, which can be over-moisturizing and lead to blocked pores or sterile folliculitis. During the dry winter season, parents should apply moisturizing cream to their children's skin three to five times a day.

Of the 250 children, 80% were bathed with soap or shower gel, which can lead to dry skin. Therefore soap and shower gel should be avoided and plain water used. Of the 250 children, 82% often perspired in winter, 84.8% wore tight-fitting clothes, and 80.8% dressed in five layers of clothing. Eczema severity was exacerbated upon awakening in 95.2% of patients. These results indicated that most patients were overheated, especially overnight, which exacerbated symptoms. To avoid overheating, a child should be dressed in a maximum of two layers of loose-fitting clothing (3), and parents should avoid dressing their children in thermal under-

wear or a jacket at night and should not use a sleeping bag.

Study results also revealed that eczema severity was exacerbated after bathing at a public bathing center because the baths are kept quite hot or contain chemicals that can cause irritation. Therefore parents should be cautioned to avoid taking their children to a bathing center. In addition, contact with wool or feathers can exacerbate infantile eczema, but the survey showed that 85.6% of the children had contact with wool or feathers. Also, some patients were exposed to sunlight for longer than 20 minutes/day and received a vaccination during an eczema flare-up. Parents should keep their children out of direct sunlight and vaccinate them only when eczema symptoms are absent.

In the study, 235 mothers avoided eating food allergens after the onset of eczema because they believed it contributed to their children's eczema, but 93.6% of the children did not improve despite the avoidance of food allergens, suggesting that the withdrawal of these food allergens does not appear to influence the course of the disease. Cow's milk allergy is a common clinical problem in children, affecting 2% to 7.5% of children and approximately 2% of children younger than 2 years old (9–11). An amino acid-based infant formula such as Neocate is thought to have minimal potential for causing an allergic reaction. In the present study, 30 children were fed Neocate instead of cow's milk, but only 10% had improvement in eczema symptoms, suggesting that allergy to cow's milk is only a minor contributor to infantile eczema. In the study, 30 patients were given food allergens, but only 13.3% experienced an eczema exacerbation. Therefore a diagnosis of food allergies should be made cautiously to avoid unnecessary dietary restrictions that could adversely affect a child's nutritional status and growth (12).

Changes in the child's environment can help prevent eczema flare-ups but do not control the underlying inflammatory process, therefore topical steroids are necessary for the treatment of eczema. This study showed that only 51.2% used corticosteroid ointment, and most stopped corticosteroid treatment as soon as their child's eczema improved. Parents should be instructed to use corticosteroid ointment regularly until the eczema clears and then intermittently for a few days. In our study, 6.2% (8/128) of the children were treated with ointment when eczema lesions were weeping, which led to eczema aggravation. Ointments are not tolerated as well because they are sticky and difficult to spread on weeping lesions. Weeping lesions should be treated with a moist dressing or compress. After weeping has subsided, corticosteroid ointments should be applied.

In conclusion, this study indicated a serious lack of understanding of the aggravating factors involved in infantile eczema. This study suggests a need for parents to understand the factors that can aggravate infantile eczema. The data support the benefit of education pro-

grams to help parents understand and control infantile eczema through modification of the child's environment and proper corticosteroid treatment. Such programs should be considered for integration into routine care.

APPENDIX

Questionnaires administered to infantile eczema patients in this study

Date of birth _____ Gender _____
 Highest education level of mother _____
 Urban _____ Rural _____
 Duration of disease (m) _____
 Duration of exacerbation (day) _____
 Family history of allergy _____
 Type of supplementary food _____

QUESTION

1. Has your child always had skin dryness and roughness?
2. Has your child ever had moisturizer applied? (yes, no)
 If yes, how often did you apply per day?
 (a) fewer than 2 times, (b) 2–3 times, (c) more than 3 times
 If yes, what kind of moisturizer?
 (a) moisturizing cream, (b) moisturizing lotion, (c) oil
 If no, please explain why you did not use moisturizer.
3. Do you use soap or shower gel when bathing your child? (yes, no)
4. How often do you bathe your child each week?
 (a) fewer than 2 times, (b) 2–3 times, (c) more than 3 times, (d) every day
5. Did your child's eczema get worse after bathing?
6. Did your child bathe or swim at a public bathing center? (yes, no)
 If yes, did your child's eczema symptoms get worse after bathing or swimming?
7. Does your child perspire often?
8. Do you dress your child in tight-fitting clothing?
9. Have you dressed your child in thermal underwear? (yes, no)
 If yes, how many layers?
10. Does your child wear a jacket or sleeping bag while sleeping? (yes, no)
 If yes, how many layers?
11. How many layers of clothing does your child wear?
12. Does your child wear a cap? (yes, no)
13. Is your child often exposed to sunlight? (yes, no)
 If yes, how long was his/her exposure to sunlight?
 Did your child's eczema get worse after exposure to sunlight?
14. Did your child's eczema get worse after vaccination?
15. Does your child often have contact with materials such as wool and feathers?
16. Do your child's eczema symptoms get worse after the mother or child eats potential food allergens (e.g., milk, egg whites, and fish)?
 If yes, does your child's eczema get worse after eating?
17. Do you or your child avoid eating potential food allergens after an episode of eczema? (yes, no)
 If yes, did the eczema symptoms improve after avoiding the food?
18. Did your child have Neocate substitute for cow's milk? (yes, no)

19. Have you applied cortisone ointment to your child? (yes, no)
If yes, how many times per day?
If no, why?
(a) I believe this disease will naturally improve.
(b) I worry about the side effects of cortisone ointment.
20. Did you use cortisone ointment when your child's eczema was weeping?

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