ORIGINAL ARTICLE

Effect of passive smoking on the severity of atopic eczema in children

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ABSTRACT

Background And Objectives: Several studies have suggested that passive smoking increases the risk of developing atopic eczema (AE). However, far too little attention has been paid to the effect of passive smoking on the severity of AE. Therefore, we aimed to investigate this question. This study is the first of its kind in the Middle East.

Design And Setting: Cross-sectional survey conducted at the pediatrics and dermatology outpatient departments at King Khalid University Hospital, King Abdulaziz University Hospital and King Fahad Medical City in Riyadh, Saudi Arabia over a one-year period.

Patients And Methods: A survey was conducted using a questionnaire and SCORAD (SCORing Atopic Dermatitis), which is a validated tool to assess the severity of AE as objectively as possible. Data were collected from the parents of the children. The questionnaire included items evaluating signs and symptoms of atopic eczema, asthma, allergic rhinitis and conjunctivitis, smoking habits and medications. Subjects were included in the study if diagnosed with AE and aged 1-12 years. They were excluded if they are HIV positive or have cancer. We divided the subjects into two age groups (1-6 and 7-12 years).

Results: Out of 118 children with AE, 56 (47.5%) were exposed to passive smoking in the year prior to enrollment in the study. Among those subjects who were exposed to passive smoking, 23.2% (n=13) had mild AE, 60.7% (n=34) had moderate AE and 16.1% (n=9) had severe AE. There was no significant difference between exposed and non-exposed children with respect to severity of AE (P=0.4). Likewise, there was no significant effect of passive smoking on the severity of AE in the two different age groups (P=0.2).

Conclusion: In our study, we found no significant effect of passive smoking on the severity of AE in Saudi children aged 1-12 years.

KEYWORDS: atopic eczema, children, passive smoking

INTRODUCTION

Atopic eczema (AE) is a chronic, itchy, and relapsing inflammatory condition of the skin, characterized by eczematous lesions and lichenification, especially in the flexure aspects of the major joints of upper and lower limbs. AE is the most common inflammatory skin disease in children, with an estimated prevalence of 5-20% in children worldwide.[1] It's prevalence has dramatically increased in recent decades.[2,3] Genetic and environmental factors are known to play a role in the development of AE.[4]

Several studies showed that passive smoking has a role in developing AE, but the results were inconsistent.[5] To the best of our knowledge, only one study investigated the effect of passive smoking on the severity of AE, it was conducted in Brazil.[6] We define passive smoking as exposure to smoke produced by smoking cigarettes by any household member within the year prior to the enrollment into our study. We anticipate that the exposure of children to tobacco smoke would aggravate signs

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and symptoms of AE. Our objective was to assess the effect of passive smoking on the severity of AE in children.

PATIENTS AND METHODS

This was a cross sectional study conducted over a period of one year. We recruited the data from the pediatrics and dermatology outpatient departments at King Khalid University Hospital, King Abdulaziz University Hospital, and King Fahad Medical City in Riyadh, Saudi Arabia. Data collection was performed by well-trained interns and senior medical students.

We included children 1-12 years old with AE. Subjects were excluded if they are HIV positive or have cancer. There are many factors such as skin care, diet and environmental factors, which are associated with the aggravation of AE. We believe this source of bias is diluted by the fact that we took both groups of our patients from the same cohort.

AE was assessed according to Hanifin and Rajka diagnostic criteria for AE where the patient must fulfill 3 or more of the major criteria and at least three minor criteria.[5] (Table 1)

A survey was conducted using a questionnaire (Appendix 1) and SCORAD (SCORing Atopic Dermatitis), which is a validated clinical tool to assess the severity of atopic eczema as objectively as possible (Appendix 2). We used SCORAD of average status instead of SCORAD of point status to minimize the effect of recent treatment on our patients.

The final face-to-face administered questionnaire was answered by the parents and pilot tested. It consisted of 33 questions that included items evaluating signs and symptoms of AE, asthma, allergic rhinitis and conjunctivitis, smoking habits and medications.

This study was approved by the ethical committee of King Khalid University Hospital, in accordance with the Helsinki declaration of 1975, as revised in 1983, and verbal informed consent was obtained from the parents.

Data was summarized as means (SD) if they were normally distributed; otherwise they were summarized as median and interquartile range (IQR). Difference between groups was assessed using Chi Square or Fisher exact test for categorical

Table 1 Hanifin and Rajka diagnostic criteria for atopic eczema

Major criteria
1. Pruritus 2. Typical morphology and distribution: A. Flexural lichenification or linearity in adults B. Facial and extensor involvement in infants and children 1. Chronic or chronically-relapsing dermatitis 2. Personal or family history of atopy (asthma, allergic rhinitis, atopic dermatitis)
Minor criteria
1. Xerosis 2. Ichthyosis, palmar hyperlinearity, or keratosis pilaris 3. Immediate (type 1) skin-test reactivity 4. Raised serum IgE 5. Early age of onset 6. Tendency toward cutaneous infections (especially S aureus and herpes simplex) or impaired cell-mediated immunity 7. Tendency toward non-specific hand or foot dermatitis 8. Nipple eczema 9. Cheilitis 10. Recurrent conjunctivitis 11. Dennie-Morgan infraorbital fold 12. Keratoconus 13. Anterior subcapsular cataracts 14. Orbital darkening 15. Facial pallor or facial erythema 16. Pityriasis alba 17. Anterior neck folds 18. Itch when sweating 19. Intolerance to wool and lipid solvents 20. Perifollicular accentuation 21. Food intolerance 22. Course influenced by environmental or emotional factors 23. White dermographism or delayed blanch.

Appendix 1: Participant questionnaire

King Saud University
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Effect of Passive Smoking on Severity of Atopic Eczema in Children

1. Personal Profile

Name:..... File No.:..... Date:..... Age:.....
Gender:..... Height:..... Weight:..... No. of family members:.....
No. of first-degree relatives having atopy:..... Who takes care of the child?.....

2. Eczema Evaluation

i. Have your child ever had an itchy rash, which was coming and going for at least 6 months? Yes ☐ No ☐

ii. Has your child ever had eczema? Yes ☐ No ☐

iii. Has your child had this itchy rash at any time in the past 12 months? Yes ☐ No ☐

iv. Has this itchy rash at any time affected any of the following places: folds of the elbows, behind the knees, in front of the ankles, under the buttocks or around the neck, ears or eyes? Yes ☐ No ☐

v. In the past 12 months how often on average has your child been kept awake at night by this itchy rash? Never ☐ Occasionally ☐ Often ☐ Always ☐

vi. Frequency of the attacks: 1-3 times per year ☐ 4-6 times per year ☐ > 6 times per year ☐

vii. Duration of the attacks: < One week ☐ 1-2 weeks ☐ 2-4 weeks ☐ > 4 weeks ☐

viii. Seasons affecting the attacks: Irrelevant ☐ Spring ☐ Summer ☐ Autumn ☐ Winter ☐

3. Asthma

i. Has your child had wheezing or whistling in the chest in the past 12 months? Yes ☐ No ☐

ii. Does your child have Asthma? Yes ☐ No ☐

4. Current rhino-conjunctivitis

i. In the past 12 months has your child had a problem with sneezing or a runny or blocked nose when he/she did not have a cold or the flu? Yes ☐ No ☐

ii. In the past 12 months has this nose problem been accompanied by itchy /watery eyes? Yes ☐ No ☐

1. Clinical Findings

i. Point status (SCORAD):.....

ii. Average current status (SCORAD):.....

2. Smoking habit:

i. Is there any smoker at home? Yes ☐ No ☐

ii. No. of smokers at home:.....

iii. Onset of smoking: Prenatal ☐ Perinatal ☐ Postnatal ☐

iv. No. of cigarettes smoked per day: 0-10 ☐ 11-20 ☐ > 20 ☐

v. Does your child stay at other smoker's house frequently? Yes ☐ No ☐

vi. Do the symptoms increase after staying at other smoker's house? Yes ☐ No ☐

vii. Is there any Shisha user at home? Yes ☐ No ☐

viii. No. of Shisha users at home:.....

ix. How often is Shisha smoked per day?.....

x. Does your child stay at other Shisha smoker's house frequently? Yes ☐ No ☐

xi. Do the symptoms increase after staying at other Shisha smoker's house? Yes ☐ No ☐

3. Aggravating factors:

Food ☐ Pets ☐ Dust ☐ Fumes ☐ Wool ☐
Others:.....

4. Treatment

i. Moisturizers Yes ☐ No ☐

ii. Moisturizers *after* bathing Yes ☐ No ☐

iii. Steroid creams Yes ☐ No ☐

iv. How frequently does he/she bathe? 1-2 times per week ☐ 3-5 times per week ☐ > 6 times per week ☐

v. Calcinurin inhibitor (Protropic/Elidel) Yes ☐ No ☐

vi. Dressing Yes ☐ No ☐

vii. Antihistamines Yes ☐ No ☐

viii. Antibiotics Yes ☐ No ☐

ix. Compliance Compliant ☐ Non compliant ☐

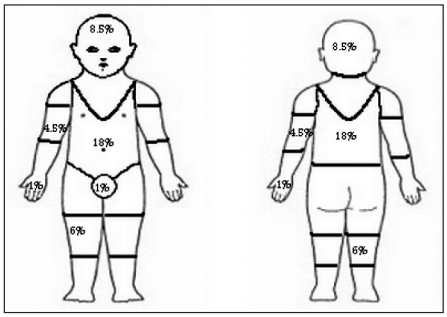
Appendix 2: SCORAD (SCORing for Atopic Dermatitis) criteria

(a) SCORAD intensity criteria:

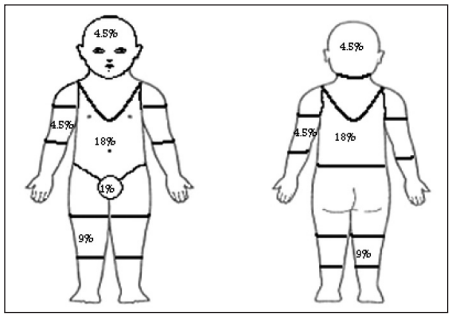
	None	Stage1	Stage2	Stage3
Erythema	0	1	2	3
Edema / papulation	0	1	2	3
Oozing / crusting	0	1	2	3
Excoriation	0	1	2	3
Lichenification	0	1	2	3
Dryness	0	1	2	3

(b) SCORAD extent criteria:

(1) SCORAD extent criteria for a patient younger than two years



(2) SCORAD extent criteria for a patient older than two years



(c) Subjective Symptoms: (1) Pruritus (2) Insomnia

variables and Mann-Whitney test for continuous variables since measurable variables did not follow the normal distribution. All analysis was considered significant at $P<0.05$, the analysis was performed using SPSS software version 17 (SPSS Inc., USA).

RESULTS

A total of 118 children with atopic eczema were enrolled (males: 67% n=79). The included children had a mean age of 5.3 (3.6) years, a mean height of 105.7 (23.8) cm, and a mean weight of 22.3 (13.9) kg. The severity of AE was classified into mild (SCORAD <25), moderate (SCORAD 25-50) and severe (SCORAD >50). Among the 56 children exposed to passive smoking at home within the year prior to enrollment, 23.2% (n=13) had mild AE, 60.7% (n=34) had moderate AE and 16.1% (n=9) had severe AE. There was no significant difference between exposed and non-exposed children with respect to severity of AE (P=0.4).

AE in children tends to improve by the age 5-6 year. Therefore we opted to divide our patients into two age groups (1-6 and 7-12 years). Nevertheless, there was no significant effect of passive smoking on the severity of AE in different age groups (P=0.2). Moreover, the effect of age on the severity of AE in non-exposed children was not statistically significant (P=0.8). There was no statistically significant effect of passive smoking on the severity of AE in different genders (P=0.8). Likewise, no significant association was observed between gender and severity in non-exposed patients (P=0.7).

DISCUSSION

Smoking prevalence is increasing around the globe. Meanwhile, Saudi Arabia is ranked 8th in the world in terms of tobacco consumption and currently imports 20 billion cigarettes per year.[7] In the eastern region of Saudi Arabia, eczema is the most common skin disease affecting 19.6% of the population, of which 35% is considered AE and this is comparable to other regions.[8]

Our cross sectional study showed no significant association between passive smoking and severity of AE among children aged 1 to 12 years. This observation is consistent with the results of a previous study in Brazil with a sample of 78 children aged 2-12 years, which showed no statistically significant relation between AE severity and passive smoking (P=0.6).[6] Moreover, when age and gender were taken into account we found no significant effect of passive smoking on the severity of AE in different genders and age groups (P-values: 0.8, and 0.2, respectively).

Taken together, these findings suggest that although there is a growing evidence that exposure to environmental tobacco smoke can have a significant impact on the severity of asthma and other allergic diseases, such exposure has no influence on the severity of AE.

The prevalence of allergic conditions has increased dramatically in recent years, especially among children. Environmental factors play an important role in the development and manifestation of allergic diseases in genetically predisposed individuals. Many studies have shown a positive association between exposure to environmental tobacco smoke and allergic disorders. Furthermore, various studies have found that such exposure influence the exacerbation of asthma in childhood.[9-11]

The Swiss Study on Air Pollution and Lung Diseases in Adults (SAPALDIA) showed that the relationship between passive smoking and the severity of asthma symptoms is dose-dependent.[12]

In atopic children, environmental tobacco smoke increased the risk and exacerbated the symptoms of respiratory allergy. However, the effect of passive smoking on the severity of AE in children is not well studied and didn't receive much attention when compared to that on asthma. If our findings are confirmed by a larger study, we hypothesize that the discrepancy between the effect of smoking on asthma and AE may be explained by the increased absorption of passive smoke by respiratory mucus membranes exerting more local effect on asthma as opposed to the skin.[13]

One of the limitations to our study is the relatively small sample. Although SCORAD is a semi-objective instrument assessing the severity of AE, it is an internationally validated tool and it helped us minimizing inter-observer variability. Another limitation to our study is the inherent recall bias regarding severity assessment and smoking habits commonly encountered in cross-sectional studies. In conclusion, our study shows no significant effect of passive smoking on the severity of AE in Saudi children aged 1-12 years, even when age and gender were taken into consideration. Further larger studies are warranted to explore this potential association.

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