

Is the question ‘Have you had childhood eczema?’ useful for assessing childhood atopic eczema in adult population surveys?

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Atopic eczema (AE) is a major risk factor for hand eczema. In Scandinavian population-based studies, the occurrence of AE in childhood has often been assessed by the question ‘Have you had childhood eczema?’ In the present study, this question was validated. A questionnaire was sent to 600 cases with AE and 600 controls without eczema or allergic disease, identified in school medical records from the 1960s. The response rate was 70.5%, and the mean age of the respondents was 36.7 years. The specificity of the question was 70.7% and the sensitivity 89.9%. The sensitivity was higher and the specificity lower in a subgroup with current hand eczema compared with a group without hand eczema. The results showed that the question overestimated the prevalence of AE in childhood by a factor of 1.6. When used for risk assessment, the question provided a better estimate of the risk of current hand eczema as compared with the lifetime risk of hand eczema. In conclusion, the validated question overestimated prevalence of childhood AE and may overestimate AE as a risk factor for hand eczema in adult population surveys.

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Contact dermatitis is common in the population, most frequently encountered as hand eczema. In Sweden, the 1-year prevalence of hand eczema is about 10% in the general population (1), and hand eczema constitutes a considerable problem as an occupational skin disease. Atopic eczema (AE) is considered to be a major risk factor for hand eczema. Studies on AE as risk factor for hand eczema are usually based on either hospital records (2) or self-report by questionnaires (3). Using hospital records for identification of individuals with AE entails a selection of more severe cases. Questionnaires give retrospective self-reported information regarding the occurrence of AE and have the drawback of recall bias, which means that mild disease may be dismissed. Besides, if the questions are diffuse or difficult for the responders to understand, the risk estimation will be uncertain. In several questionnaire-based studies on hand eczema and in population surveys in Nordic countries, the simple question ‘Have you had childhood eczema?’ has been

used to classify individuals as skin atopics (4–11). That question has the advantage of being short and easy for laymen to understand.

The aim of the present study was to validate the question ‘Have you had childhood eczema?’ in a sample from the general population.

Subjects and Methods

The design is a cross-sectional study. The term AE (also known as atopic dermatitis) is used in accordance with Williams’ criteria (12).

Study population

Medical records from children born during 1960–1969 and examined in the Swedish school healthcare in Stockholm were reviewed. School healthcare is compulsory and at that time all children in Sweden underwent a medical check-up at the age of 7, 10 and 13. At school start, when the children were 7 years old, the parents

also filled in a health declaration, where questions about eczema and allergic diseases/symptoms had to be answered with a 'yes' or 'no'.

These medical records were reviewed by a trained dermatologist (MS) who picked out 600 cases, where the notations in the records indicated AE, and 600 controls. The indications of AE used were notes in the school records by the examining physician, school nurse or parents. If the information in the medical record made the diagnosis of AE uncertain, that individual was excluded. The symptoms or findings suggestive of AE were for example itchy eczema in the flexural part of the arms or legs. As controls, individuals matched for age and sex and without notes on AE or any other eczema were selected.

It was possible to retrieve current postal addresses from the Swedish Person Register for 1111 of the 600 cases and 600 controls.

A questionnaire was mailed, and after two reminders, 783 individuals (70.5%), 405 (229 females/176 males) cases and 378 (212 females/166 males) controls had filled out and returned the questionnaire. The gender distribution in the total material (52% females) and among the responders (56% females) was quite similar. At the time of answering the questionnaire, the mean age of the cases was 36.8 (32–41) years and for the controls 36.6 (32–41) years.

Questionnaire

The questionnaire consisted of 22 items. The first question 'Have you had childhood eczema?' was followed by questions concerning occurrence of hand eczema, contacts with health care and common environmental risk factors (previously published) (13).

Reliability of case classification

To ensure the accuracy of the classification of cases, a second dermatologist independently reviewed the medical records of 100 cases. Of these, 98 were reclassified as cases showing constancy between judgements.

Statistics

Risk assessments expressed as odds ratios (OR) and 95% confidence intervals (CI 95%) were calculated by logistic regression, univariate analysis, using SPSS software (version 12.0).

The study was approved by The Ethical Committee at the Karolinska Institutet, Stockholm, Sweden.

Results

The first question in the questionnaire, 'Have you had childhood eczema?' was answered by all but 4 persons (Table 1).

Of all cases, 29.3% answered 'no' to the question on childhood eczema. Of the controls, 10.1% answered 'yes', saying that they had eczema during childhood.

The calculated sensitivity, specificity and predictive values for a positive and a negative test for the total group of responders and the corresponding data stratified for hand eczema during the past 12 months are given in Table 2. The validity of the question is different in the two subgroups. As the predictive value of the test question is dependent on the prevalence of the disease under study, the figures are given under the assumption that the prevalence of AE in the population is 15%.

Discussion

Studies on the occurrence of cutaneous conditions are dependent on reliable diagnostic criteria. In our study, we have validated one question 'Have you had childhood eczema?' as a proxy for childhood AE in a retrospective study of an adult population. This question has been used in several previous publications but has until now not been validated.

In order to critically appraise our capture of AE from medical school records, we looked at the proportion of atopic rhino conjunctivitis and asthma among our eczema cases. From previous reports, we expected the proportion of atopic respiratory disease among eczema children to be slightly over 50% (14). In our study population,

Table 1. The response to the questionnaire question: 'Have you had childhood eczema?'

Group	Yes (I have had childhood eczema)		No (I have not had childhood eczema)		Total
	<i>n</i>	%	<i>n</i>	%	<i>n</i>
Cases	285	70.7	118	29.3	403
Controls	38	10.1	338	89.9	376
Total	323	41.5	456	58.5	779

Cases – atopic eczema according to school health medical records and controls – age and gender matched controls without atopic disease.

Table 2. Calculated validity of the question 'Have you had childhood eczema?' as a proxy for childhood atopic eczema among adult persons with and without current hand eczema and in total

	Persons with hand eczema past 12 months % (CI 95%)	Persons without hand eczema past 12 months % (CI 95%)	Total % (CI 95%)
Sensitivity (CI 95%)	82.5 (73.4–89.2)	67.1 (61.5–72.3)	70.7 (66.0–75.1)
Specificity (CI 95%)	84.4 (66.5–94.1)	90.8 (87.1–93.6)	89.9 (86.3–92.7)
Predictive value of positive test ^a	48.2	56.3	55.3
Predictive value of negative test ^a	96.5	94.0	94.6

^aUnder the assumption that the prevalence of atopic eczema (positive response to the question) in the studied population is 15%. Predictive value is dependant on the prevalence of disease in the population. The 95% confidence interval is given for sensitivity and specificity.

such diseases were reported in 44% of eczema cases. It must be emphasized that a complete list of atopic symptoms and signs given by their parents was registered in each child at the age of 7. Thereafter, spontaneous reporting of symptoms was registered in school health medical records supplemented with data from two medical check-ups. While the overwhelming proportion of AE starts before the age of 7, allergic rhino conjunctivitis and asthma have a later debut. Thus, these conditions are probably underestimated in study population. An alternative explanation would be that other skin diseases, without any association to atopic respiratory diseases, are misclassified as being AE. We find this explanation unlikely as the medical records were assessed by 2 experienced dermatologists, and their diagnosis of AE was highly concordant. Taken together, these results support that the classification of cases really does reflect AE.

In the control group, among whom we did not find any signs of AE in school medical records, 10% reported in the questionnaire that they had had childhood eczema. These may have been other types of eczema such as childhood seborrhoeic eczema or they may have started after the age of 7 and been mild enough not to be mentioned in school medical records. We have no Swedish epidemiology data on the occurrence of childhood seborrhoeic eczema. According to an Australian study of children aged 5 years and younger, seborrhoeic eczema was found in 10%. Most children had a mild disease, and only 1 of 10 had sought advice from general practitioners (15). In our study population, childhood seborrhoeic eczema very unlikely occurred in controls before the age of 7 as there were no reports of eczema from their parents. It is difficult to assess the impact of seborrhoeic eczema misclassified as AE in population studies where the validated question is used for risk assessment. However, we find no reason to believe that the misclassification should be different in a group with hand

eczema as compared with a group without hand eczema. If this is correct, the misclassification is non-differential resulting in an underestimation of childhood eczema as risk factor.

When studying the prevalence of a certain disease in a population, a random sample of the population is often used for classifying those who have the disease and those who do not. Even if it seems reasonable to estimate prevalence by the proportion in the sample that is classified as having the disease, this procedure may result in a considerable bias.

The estimated prevalence of diseased persons in the sample has two components, true positives and false positives. The proportion of individuals classified as sick is then:

$$P^* = P(\text{true prevalence}) \times \text{sensitivity} + (1 - P) \times (1 - \text{specificity}) \quad (16)$$

The overestimation of prevalence can be relatively large if the true prevalence is low. This is explained by the large proportion of false positives that comes from the healthy part of the population even when the specificity is high. Because the equation above can be solved for P , a corrected estimate may be obtained where the sensitivity and the specificity are both known.

$$P = \frac{P^* + (\text{specificity} - 1)}{\text{sensitivity} + (\text{specificity} - 1)} \quad (16)$$

Our results imply that the question 'Have you had childhood eczema?' can be used as a proxy for AE in prevalence studies and risk assessments given that the above-mentioned pitfalls are taken into account. To illustrate this, we present the following two examples:

In 1990, Meding and Swanbeck (4) published population data from a questionnaire study of a random sample from the adult population in Gothenburg, Sweden. They reported the prevalence of childhood eczema to be 10.4%. The same question as the one we have validated was used.

Applying our validation data on their results gives an estimated 'true' prevalence of 6.5%.

In the present study, we asked the respondents whether they ever had had hand eczema ('hand eczema ever') and if they at any occasion during the past 12 months had had hand eczema ('1-year period prevalence of hand eczema'). A risk analysis of 'hand eczema ever' using AE cases from the school medical records as risk indicator (gold standard) gives an OR of 4.6 with 95% CI 3.2–6.6. The corresponding figures when using 'childhood eczema' according to the questionnaire as risk indicator is 6.7 (4.7–9.4). This overestimation by a factor of 1.5 is significant. This difference is caused by the validity of the question in itself and by a higher proportion of false-positive cases of childhood AE among persons reporting hand eczema ever than among those without hand eczema (data not shown). Thus, under similar circumstances, risk assessment expressed as OR should be adjusted according to our findings.

Contrary to this example, risk assessment of the 1-year period prevalence of hand eczema gives similar risk figures, 3.4 (2.2–5.2) using AE cases from the school medical records and 3.3 (2.2–5.0) using 'childhood eczema' as risk indicators. Here, the proportion of false-positive cases of childhood AE is lower among persons reporting hand eczema during the past 12 months than among those not reporting hand eczema (data not shown).

In conclusion, the validated question 'Have you had childhood eczema?' overestimates the prevalence of childhood AE and may overestimate AE as a risk factor for hand eczema in adult population surveys. When used in population studies and risk assessments as a proxy for AE, the validity of the question should be taken into account.

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