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Evaluation of a Self-reported Questionnaire on Hand Dermatosis in Secondary School Children

MARIA YNGVESON[1], ÅKE SVENSSON[1] and ÅKE ISACSSON[2]

Departments of [1]Dermatology and [2]Community Health Science, University of Lund, Sweden

The purpose of this study was to investigate the reliability and validity of a self-reported questionnaire for estimating the prevalence of hand eczema and other hand dermatoses. All pupils in grades 1 and 3 from the secondary schools in Växjö, in southern Sweden, were invited to participate in the study, which consisted of two parts, a questionnaire and a clinical examination. Of those invited, 2572 (98.6%) responded to the questionnaire. Of the respondents, 2535 pupils (98.5%) were clinically examined. The kappa value for the questionnaire findings, compared with the diagnosis from the clinical examination, was 0.79, indicating good agreement. The sensitivity of the questionnaire findings was 73% (95% confidence interval [CI]: 0.6425–0.7975), and the specificity was 99% (95% confidence interval [CI]: 0.9860–0.9940). The self-reported questionnaire was suitable for detecting hand dermatosis in a population of secondary school children and may be used as a cost-effective and reliable method of investigating the prevalence of hand dermatosis in epidemiological studies. ***Key words: hand eczema; questionnaire validity; clinical examination; evaluation; nurse ability.***

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Å. Svensson, M.D., Central Hospital, S-291 85 Kristianstad, Sweden.

Hand dermatosis, particularly hand dermatitis of the eczematous type, is a common disorder, which is creating growing problems and is a cause of suffering (1–4). There is a need for epidemiological studies on hand eczema in different geographical areas, as well as in different populations, since it is important, for example, as a basis for health care advice and for carrying out preventive measures in different arenas of society. However, internationally accepted criteria for defining hand eczema in epidemiological studies need to be formulated. Epidemiological studies have frequently used questionnaires or a combination of questionnaires and clinical examination (1, 5–9). A questionnaire may be used as a cost-effective and reliable method of studying the prevalence of hand eczema in different areas and at different times. It is, however, important to establish the validity and the reliability of questionnaires used in epidemiological surveys of hand eczema. The aim of this study was to investigate whether the use of a self-reported questionnaire is a reliable way of estimating the prevalence of hand eczema and other hand dermatoses.

MATERIAL AND METHODS

Study population

The study was conducted in the spring of 1995 in Växjö, Sweden. Växjö, situated in southern Sweden, is a small university town with four secondary schools. In Sweden the majority of teenagers aged 16–19 years attend secondary school for 3 years. In Växjö the same proportion of the age group (74%) attended secondary school in 1995 as in the whole country. All pupils in grades 1 and 3 from four secondary schools in Växjö, a total of 2609 pupils, were invited to participate in the study, which consisted of two parts, a questionnaire and a clinical examination. Of those invited, 2572 (98.6%) responded to the questionnaire. Of the respondents, 2535 pupils (98.5%) were clinically examined. The questionnaire was distributed to the pupils during class. At least one of the investigators was present on all occasions while the questionnaires were completed. Those students who for any reason were unable to attend the class at the time when the questionnaire was to be answered received a mailed questionnaire. No more than two reminders were sent. The questionnaire was preceded by oral and written information about the investigation to the principal of the school district, school health personnel and the pupils. The study was approved by the Ethics Committee of the Medical Faculty of Lund University.

Questionnaire

A questionnaire on skin disease epidemiology has been developed by a group of Finnish dermatologists (10). An earlier version of the questionnaire contained eight sections, including questions regarding: A. prevalence of self-reported hand dermatosis, B. symptoms of hand dermatosis, C. exacerbating factors, D. medical consultations and skin tests, E. consequences and life-impact of dermatosis, F. prevalence of other dermatoses, G. skin symptoms and H. symptoms of metal allergy and sensitive skin.

The Finnish version of the questionnaire has been found to be valid with a high specificity but a lower sensitivity (8, 10). An earlier version of the questionnaire (10) was translated from English into Swedish by two of the investigators of the present study. To ensure the content validity of the English version, another group of experienced dermatologists revised the Swedish version of the questionnaire. Some members of this expert group had previously taken part in the construction of the English version.

The suitability of the questionnaire was tested in a pilot study comprising 66 secondary school pupils in grade 2 in December 1994 in Växjö. The pilot study revealed that the pupils had a good understanding of the questionnaire. In this study, we especially focused on the prevalence of self-reported hand dermatosis (section A of the questionnaire). In this part of the questionnaire the pupils had to answer the following question: "Have you ever had or do you now have eczema or other rash on your fingers, fingerwebs, palms, backs of hands or wrists?" Furthermore, the responders were asked to indicate their dermatosis areas by shading them on a picture of both sides of the hands.

Clinical examination

The clinical examinations were performed by either a dermatologist (ÅS) or a nurse (MY) with special training in dermatology (the dermatology course for medical students at Malmö University Hospital), on the same day and in the same facilities as where the students completed the questionnaire. Both examiners were unaware of the pupils' answers in the questionnaires. Those students who received a mailed questionnaire (1.5%) were examined in the school within 4 days after the questionnaire was handed in. At the clinical examination the following morphological features were looked for: erythema, induration, papules, vesicles, scaling, pustules, lichenification and fissures. On the other hand, no systematic registration was made of, for example, pigmentary disorders or warts. The clinical features found on fingers and hands were documented on special

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forms. Acute papulovesicular dermatitis with erythema and/or crusting or more chronic erythematous, scaling and/or fissuring or lichenified dermatitis were defined as an eczematous reaction by clinical examination. Lesions on the wrist only were not defined as hand dermatosis.

Interrater reliability

To test the ability of a trained nurse to diagnose eczema or other rashes of the hands, the interrater reliability between the clinical examinations of the dermatologist and the nurse was studied. A school nurse was asked to collect a group of people who would participate in this part of the study. According to our intention, she was to collect a group of which about one half had hand dermatosis and the other half did not have such problems. The group investigated consisted of 58 students and 2 teachers not taking part in the main study. All were independently examined by the nurse and by the dermatologist on the same day. Clinical findings during the examination were documented on special forms. The dermatologist and the nurse had no previous knowledge of the hand conditions of the subjects.

Statistical analysis

The degree of agreement between the two clinical investigators' diagnoses of hand eczema and other hand dermatoses in the same subject was calculated using kappa statistics. Kappa statistics can be used as a true measure of interrater reliability (11, 12). Kappa values compensate for the agreement between raters due to chance (11, 13, 14). The values were interpreted by following the guidelines of Altman (14). In order to evaluate the agreement between the questionnaire diagnosis and the diagnosis from the clinical examination, we also used kappa statistics to calculate a measure of the construct validity of the questionnaire. To further assess the validity of the questionnaire, we computed the sensitivity and specificity, using the medical diagnosis from the clinical examination as a golden standard. The sensitivity is the proportion of positively identified individuals with hand eczema or other hand dermatoses who were correctly identified by the test. The specificity is the proportion of the negatively identified individuals correctly identified by the test.

RESULTS

Of the 2572 pupils who answered the questionnaire, 107 reported that they had hand eczema or other hand dermatoses at present. Thirty-seven respondents, of whom 2 reported that they had hand eczema or other rashes at present, were not clinically examined. In the clinical examination of the remaining 2535 pupils (1245 males and 1290 females), 120 pupils were found to have current hand eczema, while other hand dermatoses were discovered in 9 pupils (Table I).

In the interrater reliability test 60 persons were investigated. The dermatologist identified 26 and the nurse 23 cases with hand eczema, and both investigators found one case of another dermatosis among the 60 investigated persons.

The kappa value for the agreement rates between the dermatologist and the nurse in the clinical examination, according to Altman (14), indicates a very good agreement (0.9). The kappa value for the questionnaire findings compared with the diagnosis from the clinical examination was 0.79, indicating good agreement. When the clinical examination was regarded as the golden standard, the sensitivity of the questionnaire findings was 73% (95% confidence interval [CI]: 0.6425–0.7975) and the specificity was 99% (95% confidence interval [CI]: 0.9860–0.9940). It was found that 11 individuals (10%) of the 105 who stated in the questionnaire that they currently had eczema or rash on the hands were wrong, false positives. Moreover, 35 subjects (1.4%) of 2430 investigated were considered false negatives. Thus the positive predictive value was 0.90 and the negative predictive value was 0.99 (Table II). Among the individuals with false negative diagnosis there were 31 respondents with hand eczema, 3 with psoriasis of the hands and one with self-induced excoriations of the hands.

Table I. *Questionnaire findings compared to clinical diagnosis*

Questionnaire findings[1]	Clinical diagnosis			
	No hand dermatosis *n*	Current hand eczema *n*	Other hand dermatosis *n*	Total *n*
Never hand dermatosis	2195	18	2	2215
Current hand dermatosis	11	89	5	105
Previous hand dermatosis	200	13	2	215
Total	2406	120	9	2535

1. Questions phrased: "Have you ever had or do you now have eczema or any other rash on your fingers, fingerwebs, palms, backs of hands or wrists?"
"When was the last time you had this hand dermatosis?"
at this moment.
not at this moment but within the past 3 months.
3–12 months ago.
over a year ago.

DISCUSSION

The present study showed that the self-reported questionnaire was appropriate for detecting hand dermatosis in an unselected population. We found a high specificity (99%), but lower sensitivity (73%), when we compared the questionnaire diagnosis with medical diagnosis obtained in clinical examination. Only 1.4% of the respondents who were found to have hand dermatosis in the clinical examination did not report hand dermatosis in the questionnaire. If results from different populations or over time are to be compared, then questionnaire validity and reliability are important. In a Dutch study, Smit et al. (7) evaluated two types of questionnaires: self-reported diagnosis and symptom-based diagnosis. Their evaluation of the symptom-based diagnosis questionnaire indicated an over-reporting of hand dermatitis, giving a very high sensitivity (100%) but a low specificity (64%). The questionnaire for self-reporting diagnosis showed a sensitivity of 65% and a specificity of 93%.

In a study where the Finnish version of the questionnaire was used, a validation study of the questionnaire was also

Table II. *Questionnaire findings compared with diagnosis by clinical examination*

Questionnaire finding	Clinical examination		
	Hand dermatosis *n*	No hand dermatosis *n*	Total *n*
Current hand dermatosis	94	11	105
No current hand dermatosis	35	2395	2430
Total	129	2406	2535

carried out, showing a high specificity (100%) but a low sensitivity (60%) for the question: "Do you have a skin disease now?" (8, 10). However, the validation was performed in a relatively low number of individuals and did not focus exclusively on lesions of the hands.

According to the two studies mentioned above, a combination of a self-reported diagnosis and a symptom-based diagnosis questionnaire is favourable. However, a reasonably high specificity in screening procedures is essential for cost-effectiveness. The questionnaire used in our study showed a very high specificity and in our opinion a satisfactory sensitivity. It is reasonable to believe that the individuals with hand dermatosis not caught by the questionnaire had minor defects and mild symptoms. Performing clinical examinations in epidemiological studies demands resources; therefore, there is a need for standardized and valid questionnaires (6–8, 15, 16). Within dermatology many questionnaires have been used in the examination of different occupational groups. In a population where there is not much experience of hand dermatosis, as for example in secondary school pupils, the questionnaire should be reasonably sensitive and have a very high specificity.

If a clinical examination of an unselected population such as secondary school children is feasible, slightly over 10% of the population needs to be examined by clinical examination. Ideally, this clinical examination should be performed by an experienced dermatologist. However, in order to survey hand dermatosis problems in school children regularly, the examination has to be integrated into the school health care. Thus, the ability of the school nurse to diagnose hand eczema and other hand dermatoses is important. Our study showed that a nurse with special education was in very good agreement with a qualified dermatologist.

In conclusion, the questionnaire was a valid and reliable instrument for the study of hand dermatosis in secondary school children.

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