

Review Article

Nordic Occupational Skin Questionnaire (NOSQ-2002): a new tool for surveying occupational skin diseases and exposure

P. SUSITAIVAL¹, M.-A. FLYVHOLM², B. MEDING³, L. KANERVA⁴, M. LINDBERG⁵, Å. SVENSSON⁶ AND J. H. ÓLAFSSON⁷

¹Department of Dermatology, North Karelia Central Hospital, Joensuu, Finland, ²National Institute of Occupational Health, Copenhagen, Denmark, ³National Institute for Working Life, Stockholm, Sweden, ⁴Finnish Institute of Occupational Health, Helsinki, Finland, ⁵Occupational and Environmental Dermatology, Stockholm County Council, Stockholm, Sweden, ⁶Department of Dermatology, University Hospital, Malmö, Sweden, ⁷Department of Dermatology, Landspítali, University Hospital, Reykjavik, Iceland

Occupational skin diseases are among the most frequent work-related diseases in industrialized countries. Good occupational skin disease statistics exist in few countries. Questionnaire studies are needed to get more data on the epidemiology of occupational skin diseases. The Nordic Occupational Skin Questionnaire Group has developed a new questionnaire tool – Nordic Occupational Skin Questionnaire (NOSQ-2002) – for surveys on work-related skin disease and exposures to environmental factors. The 2 NOSQ-2002 questionnaires have been compiled by using existing questionnaires and experience. NOSQ-2002/SHORT is a ready-to-use 4-page questionnaire for screening and monitoring occupational skin diseases, e.g. in a population or workplace. All the questions in the short questionnaire (NOSQ-2002/SHORT) are included in the long version, NOSQ-2002/LONG, which contains a pool of questions to be chosen according to research needs and tailored to specific populations. The NOSQ-2002 report includes, in addition to the questionnaires, a comprehensive manual for researchers on planning and conducting a questionnaire survey on hand eczema and relevant exposures. NOSQ-2002 questionnaires have been compiled in English and translated into Danish, Swedish, Finnish and Icelandic. The use of NOSQ-2002 will benefit research on occupational skin diseases by providing more standardized data, which can be compared between studies and countries.

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Occupational skin diseases are among the most frequent work-related diseases in industrialized countries. They are often chronic, affect mostly workers in their prime working age and the impact on the individual and the society is considerable.

Eczema is the most common chronic dermatosis affecting the hands. The proportion of diagnosed eczema of self-reported skin diseases/eczema on hands has been around 90% in clinical surveys of Nordic populations (1, 2).

According to questionnaire studies during recent decades, the 1-year prevalence of hand dermatitis (all subjects reporting hand dermatosis/eczema within a year) has varied in general populations from 2.5 to 8.8% in men and from

5.4 to 14.6% in women (3–7), and in occupational populations from 2.9 to 32% (6, 8–11). In several Finnish surveys during the 1990s using the Tuohilampi questionnaire, the 12-month cumulative prevalence of self-reported hand and forearm dermatitis has in risk occupations been between 8 and 37% (8–35% in men and 16–37% in women), and in general population 8% (10, 12–16). In a Danish questionnaire study made in 2000, 13% of the work force reported skin problems on hands or forearms within the past 3 months (women 15%; men 10%). Compared to similar studies from 1990 and 1995, a significant increase was observed among women and especially in the age group between 30 and 39 years (17).

Good occupational skin disease statistics exist in few countries. Thus, questionnaire studies are needed to get more data on the epidemiology of occupational skin diseases in different countries. Comparing results of occupational skin disease studies has been difficult because no standard methods have previously been available for epidemiological studies on work-related skin diseases. Standardized survey methods are needed for comparing results of epidemiological studies, workplace assessments and interventions. A group of Nordic researchers (the Nordic Occupational Skin Questionnaire Group), supported by the Nordic Council of Ministers, has developed a new questionnaire tool – Nordic Occupational Skin Questionnaire (NOSQ-2002) – for surveys on work-related skin disease and exposures to environmental factors (18).

Questionnaire methods for assessing hand dermatitis

Epidemiological studies collect information on the distribution and determinants of diseases in populations. The signs or symptoms of diseases are used as disease (*case*) criteria. The results of a questionnaire study depend on the *definition of cases* and other determinants used in the analysis. The questions, questionnaires and definitions should be as reliable and valid as possible. *Sensitivity* (the ability to detect the sick) and *specificity* (the ability to detect the healthy) provide information on how well the method (for example questionnaire) differentiates between the sick and the healthy.

Several studies on the epidemiology of skin diseases or atopy have included some evaluation of the accuracy of reporting allergies or skin diseases (2, 5, 19) or have been designed to evaluate specific methodology or questionnaires (20–29). In several of the above publications, the clinical or the questionnaire case criteria are not clearly defined. Medical diagnosis is accepted as a gold standard in many studies without any specified criteria. Another problem in the interpretation and comparison of the studies is the variability in the vocabulary and meaning of dermatological terms in different countries.

2 methods have been used to diagnose hand eczema in questionnaire studies: a self-report (self-diagnosis) of hand dermatoses or eczema (*'Have you had...?'*) or a diagnosis based on a symptom list (symptom-based diagnosis). In the validations, clinical hand eczema has been diagnosed in 54–94% of the respondents reporting hand eczema/dermatitis in questionnaire studies (*'Have you had...?'*/*'Do you have...?'*) (1, 2, 21, 26, 27, 30, 31).

The highest prevalence figures have been obtained in the Nordic countries. In a Swedish study of respondents' opinion on having current hand eczema, the agreement with the following dermatological evaluation was good, with a sensitivity of 87% and specificity of 79%, while the agreement on specific symptoms was clearly poorer (28). The specificity of the self-report of hand eczema/dermatitis has been high in the validations (usually over 90%) while the sensitivity has been lower (less than 70%) (2, 21, 26, 27). The results indicate that the self-report, at least in the studied populations, is more likely to underestimate than overestimate the true prevalence of hand eczema. Symptom-based hand eczema diagnosis can be more sensitive but has proved to be inconsistent, even when the same method has been used in different populations in the same country (21, 29).

A history of atopic dermatitis is a well-known risk factor for hand dermatitis, and it is important to assess the atopic status of the population in hand eczema studies. Respiratory atopy (asthma and allergic rhinitis) has also been reported as a risk factor for hand eczema (5, 13, 32, 33). History of atopic symptoms, prick test reactivity and a combination of both has been used as indications of an atopic constitution. A Danish study indicates that there is a good association between positive prick tests and answers to questionnaires about respiratory symptoms (34).

In the study by Williams et al. (22–25, 35, 36), a UK working party has systematically designed and validated the clinical criteria for atopic eczema. The results of the validation study indicated that the prevalence of atopic dermatitis could be reasonably well estimated on the basis of questions alone in the studied populations (22, 24). The criteria have been tested in a population of school children, resulting in a sensitivity of 80% and specificity of 97%, when adjusted for a period of the past year (25). The same group also evaluated the question 'Have you had an itchy rash that has been coming and going for at least six months, which at some time has affected skin creases?', with a sensitivity of 73% and a specificity of 87% (22).

NOSQ-2002

NOSQ-2002 questionnaires have been compiled by using existing questionnaires and experience, for example, the Finnish Tuohilampi questionnaire (37), the Copenhagen Allergy Study 1990 and 1998 (38, 39), questions used in Swedish studies by Birgitta Meding and coworkers (5, 9, 11, 33, 40) and the Danish Work Environment Cohort Study (DWECS) (41–43). For areas not

covered in existing questionnaires new questions have been designed, e.g. for urticaria, skin tests, type of work and exposures.

NOSQ-2002 includes 2 questionnaires, a short and a long one. NOSQ-2002/SHORT is a ready-to-use 4-page questionnaire for screening and monitoring occupational skin diseases, e.g. in a population or workplace. All the questions in the short questionnaire (NOSQ-2002/SHORT) are also included in the long version NOSQ-2002/LONG, which is meant for occupational skin disease or hand eczema research. All questions included in NOSQ-2002/SHORT are listed in *Appendix*. NOSQ-2002/LONG is a pool of questions to be chosen according to research needs and tailored to specific populations, such as occupational groups, according to the instructions given in the NOSQ-2002 report. The questionnaire includes questions on demographics and occupational history, history of atopic symptoms, self-reported hand and forearm eczema, exacerbating factors, consequences and life impact of dermatoses, self-reported contact urticaria on hands and forearms, skin symptoms, skin tests, exposures, general health and household size. Table 1 provides an overview on the question sets included in NOSQ-2002, the number of questions and lists the key topics included in each question set.

For the history of atopic dermatitis, NOSQ-2002 has included the single UK-working party question (*'Have you had an itchy rash that has been coming and going...'*) (22). In addition, national atopic dermatitis questions, which have been widely used in Nordic studies, have been included (*'Have you had "flexural/childhood" eczema?'*) in the Nordic translations and in the English NOSQ-2002/INFO version. The Nordic versions of the question will be validated against the UK-working party question. Preliminary results from ongoing Danish workplace intervention studies using NOSQ-2002 (44) shows that respondents with work-related eczema involving the forearms tend to answer positively to the UK question on atopic dermatitis. Thus, this question seems to be less suitable for detecting atopic dermatitis in adult populations with work-related skin diseases including the forearms (45).

There is a definite demand for both clinical and questionnaire criteria for hand eczema in epidemiological studies. So far, we recommend the use of self-diagnosis (*'Have you had...?'*) when assessing prevalence of hand dermatitis in populations. Still, differences in the perception of what the enquired-about skin condition (hand eczema, for example) is will cause variation in this measure in different languages, occupational groups and cultures. Questions about symptoms,

Table 1. Question sets included in NOSQ-2002/LONG and list of topics included in each question set

Question set	Question numbers	Topics and key question
Demographics and occupational history	General G1–G8	Sex, age, employment status Present occupation Major activity at work
History of atopic symptoms	Atopy A1–A4	Atopic dermatitis Hay fever/rhinitis Allergic eye symptoms Asthma
Self-reported hand and forearm eczema	Dermatitis D1–D12	Areas affected Eczema history Severity (linear scale)
Exacerbating factors	Factors F1–F4	Worsening factors at work/outside work Improvement away from work
Consequences and life impact of dermatoses	Consequences C1–C3	Occupational activities Other areas
Self-reported contact urticaria on hands and forearms	Urticaria U1–U9	Urticaria history Severity (linear scale)
Skin symptoms	Symptoms S1–S5	Symptoms of dermatitis Symptoms of sensitive skin Nordic atopic dermatitis questions
Skin tests	Tests T1–T3	Test history Allergies found
Exposures	Exposure E1–E8	Glove use and glove type Glove related symptoms Exposures at work and outside work Hand washing
General health and household size	Health/Household H1–H2	One general health question Children younger than 4 years of age

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Address:

Mari-Ann Flyvholm
Senior researcher, M.Sc., Ph.D.
National Institute of Occupational Health
Lersø Parkallé 105, DK-2100 Copenhagen
Denmark
Tel: +45 39 16 52 80
Fax: +45 39 16 52 01
e-mail: maf@ami.dk

Appendix

Questioned items included in NOSQ-2002/SHORT. For questions in NOSQ-2002/LONG, see <http://www.ami.dk/NOSQ> or (18)

G1	Workplace and Department
G2	Sex
G3	Year of birth
G5	Present occupation, from which year?
G6	Major activity at work, since which year?
G7	Hours per week in main job (on average)?
G8	Any other paid work regularly, type and hours per week.
D1	<i>Have you ever had hand eczema?</i>
D2	<i>Have you ever had eczema on your wrists or forearms (excluding fronts of elbows)?</i>
D5	<i>When did you last have eczema on your hands, wrists or forearms?</i> [separate answers for “Hand eczema” and “Wrist/Forearm eczema”]
F1	Exacerbating factors in work
F2	Exacerbating factors outside work
F4	Improvement of eczema when away from normal work.
A1	UK-working party single question on atopic eczema (22).
