

ORIGINAL ARTICLES

Occupational Dermatoses: Cross-Cultural Adaptation of the Nordic Occupational Skin Questionnaire (NOSQ-2002) From English to Spanish and Catalan

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Abstract. *Background.* Eczema of the hands and urticaria are very common occupational dermatoses. The Nordic Occupational Skin Questionnaire (NOSQ-2002), developed in English, is an essential tool for the study of occupational skin diseases. The short version of the questionnaire is useful for screening and the long version is used to study risk factors.

Objective. The aim of this study was to culturally adapt the long version of the NOSQ to Spanish and Catalan and to ensure comprehension, semantic validity, and equivalence with the original.

Methods. The principles of the International Society for Pharmacoeconomics and Outcomes Research for good research practices were applied. A 4-phase method was used, with direct, revised translation, back translation, and cognitive interviews.

Results. After direct translation, a first version was issued by the Spanish Working Group. This version was evaluated in cognitive interviews. Modifications were made to 39 questions (68 %) in the Spanish version and 27 questions (47 %) in the Catalan version. Changes included addition of examples to improve understanding, reformulation of instructions, change to use of a direct question format, and addition of certain definitions. The back translation was evaluated by the original authors, leading to a further 7 changes in the Spanish version and 2 in the Catalan version. The third consensus version underwent a second round of interviews for cognitive debriefing, after which the definitive version in each language was issued.

Conclusion. Spanish and Catalan versions of the NOSQ-2002 questionnaire are available at www.ami.dk/NOSQ and www.arbejdsmiljoforskning.dk.

Key words: occupational dermatosis, cognitive interviews, hand eczema, Nordic Occupational Skin Questionnaire-2002, urticaria.

DERMATOSIS PROFESIONALES. ADAPTACIÓN TRANSCULTURAL DEL CUESTIONARIO NORDIC OCCUPATIONAL SKIN QUESTIONNAIRE (NOSQ-2002) DEL INGLÉS AL CASTELLANO Y AL CATALÁN

Resumen. *Antecedentes.* El eccema de las manos y la urticaria son dermatosis profesionales muy frecuentes. El cuestionario NOSQ (Nordic Occupational Skin Questionnaire) fue creado en inglés como herramienta imprescindible para la investigación de enfermedades cutáneas de origen laboral. La versión corta del cuestionario es útil para el rastreo y la versión larga es una herramienta de investigación de los factores de riesgo.

Objetivo. Adaptación transcultural de la versión larga del cuestionario NOSQ al castellano y al catalán para garantizar la claridad en la comprensión, la corrección semántica y la equivalencia respecto a la versión original.

Métodos. Principios de buena práctica de la International Society for Pharmacoeconomics and Outcomes Research (ISPOR). Metodología en 4 fases basada en la traducción directa consensuada, la retrotraducción y las entre-vistas cognitivas.

Resultados. Tras la traducción directa e independiente del cuestionario, el Grupo de Trabajo Español emitió una primera versión que fue sometida a entrevistas cognitivas. Se

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modificaron 39 cuestiones (68%) en la versión castellana y 27 (47%) en la versión catalana. Los cambios consistieron en la adición de ejemplos para mejorarla comprensión, la reformulación de instrucciones, el cambio al uso de un formato directo de pregunta y la adición de ciertas definiciones. La retrotraducción fue valorada por los autores originales, incorporándose 7 cambios en la versión castellana y 2 en la catalana. La tercera versión consensuada fue sometida a un segundo turno de entrevistas cognitivas. Se emitió posteriormente la versión definitiva.

Conclusión. Las versiones en castellano y catalán del cuestionario NOSQ-2002 están disponibles en www.ami.dk/NOSQ y www.arbejdsmiljoforskning.dk.

Palabras clave: dermatosis profesional, entrevistas cognitivas, eccema de manos, NOSQ-2002, urticaria.

Introduction

Work-related dermatoses are common conditions in industrialized countries and are usually among the first occupational diseases to be reported.^{1,2} The estimated average incidence in Europe ranges from 0.5 to 1.9 cases per 1000 employed person-years, but between-country comparisons are difficult. Because national registries usually record cases when a worker requests sick leave or disability compensation, statistics derived from these sources underestimate the problem. Compensation is awarded in over 30% of cases.

Contact eczema accounts for around 90% to 95% of cases of work-related skin disease. The diagnosis, treatment, and prevention of chronic hand eczema always present challenges.³ The prevalence in the general population is between 2.5% and 8.8% in men and between 5.4% and 14.6% in women.⁴⁻⁸ Among workers, however, the prevalence has been found to be as high as 32%.^{7,9,10}

Few screening tools are available for occupational skin diseases. Questionnaires for self-reporting or those based on symptom lists that have been used in various studies and countries contain item differences that make comparison difficult.^{11,12}

A group of occupational dermatosis researchers based in Nordic countries has developed the Nordic Occupational Skin Questionnaire (NOSQ). Their aim was to standardize methods of study between countries by creating a questionnaire that would allow results to be compared. The NOSQ-2002 was based on existing instruments the researchers were well acquainted with, namely the Finnish Tuohilampi Questionnaire, the Copenhagen Allergy Study of 1990 and 1998, the Danish Work Environment Cohort Study (DWECS), and a Swedish study by Meding and colleagues. The NOSQ offers certain advantages over other questionnaires, as it includes items asking about exposure and also enquires about occupational urticaria. The working group published

the NOSQ in 2003 in English as it is one of the most widely-spoken languages.¹³

Two versions were developed. The short questionnaire (the NOSQ-2002/SHORT) serves the purposes of case finding and surveillance of work-related dermatoses of the hands and forearms. The longer version (the NOSQ-200/-LONG) assesses hand and forearm eczema and urticaria as occupational skin diseases. This version also serves the purpose of detecting risk factors.

The English NOSQ is written in scientific medical language and must be adapted to everyday language before use. The information accompanying the questionnaire (the NOSQ-2002/INFO) includes a review of the epidemiology of eczema and an account of the design and rubrics of the instrument as well as a description of the procedure to follow to ensure high-quality translation.

Both short and long versions are available in Danish, Swedish, Finnish, Icelandic, and Norwegian. All can be freely downloaded from www.ami.dk/NOSQ. Sale is prohibited.

The NOSQ Group continues to call for cultural adaptations of the questionnaire for use in other languages in the interest of standardizing criteria through use of a normed instrument so that results between countries can be compared.

The aim of this study was to develop Castilian and Catalan cultural adaptations of the NOSQ-2002 questionnaire for use in Spain and Catalonia. The authors' permission was obtained.

Material and Methods

The NOSQ-2002 project provides both short and long versions of the questionnaire, both for use in the general population.

The NOSQ-2002/SHORT is a simple 4-page instrument for studying work-related skin diseases. It provides information that is useful for prevention and

Table 1. Dimensions, Questions (Items), and Content of the Short Version of the Nordic Occupational Skin Questionnaire-2002

<i>Dimensions</i>	<i>Item Numbers</i>	<i>Item Content</i>
Employment history and personal data	General, G1-G3, G5-G8	Sex, age, type of employment. Current occupation. Main activity at work.
History of allergy symptoms	Allergy, A1	Allergic dermatitis.
Eczema of the hands and forearms	Dermatitis, D1-D2, D5	Areas affected. History of eczema.
Trigger factors	Factors, F1-F2, F4	Factors that worsen eczema at work and away from work. Factors that improve eczema away from work.

Table 2. Dimensions, Questions (Items), and Content of the Long Version of the Nordic Occupational Skin Questionnaire-2002

<i>Dimensions</i>	<i>Item Numbers</i>	<i>Item Content</i>
Employment history and personal data	General, G1-G8	Sex, age, type of employment. Current occupation. Main activity at work.
History of allergy symptoms	Allergy, A1-A4	Allergic dermatitis. Hay fever, rhinitis. Eye symptoms of allergy. Asthma.
Eczema of the hands and forearms	Dermatitis, D1-D12	Affected areas. History of eczema. Severity (linear scale).
Trigger factors	Factors, F1-F4	Factors that worsen eczema at work and away from work. Factors that improve eczema at work and away from work.
Social consequences of the skin diseases	Consequences, C1-C3	Activities at work. Activities in other settings.
Contact urticaria on the hands and forearms	Urticaria, U1-U9	History of urticaria. Severity (linear scale).
Skin symptoms	Symptoms, S1-S5	Symptoms of dermatitis. Symptoms of sensitive skin. Symptoms of atopic dermatitis.
Skin tests	Tests, T1-T3	History of diagnostic workup. Allergies diagnosed.
Exposures	Exposure, E1-E8	Use of gloves and glove type. Symptoms related to use of gloves. Exposure at work and away from work. Hand washing.
General health and immediate family	Health, H1-H2	A general question about the patient's own view of his or her health. Includes a question about the number of children under 4 years of age living at home.

health surveillance. This version can be used to find cases of hand and forearm eczema in the workplace. Thirteen questions are grouped in 4 dimensions (Table 1).

The long version contains 57 questions grouped in 10 dimensions (Table 2). This instrument can be adapted for specific populations such as particular occupational groups (eg, health care workers, cleaners at swine slaughterhouses, etc).^{14,15}

To culturally adapt the NOSQ-2002 from English to Castilian and Catalan, we used the translation protocols published in 1998 by Kvamme et al¹⁶ and Bjorner et al¹⁷

and the recommendations of the International Society for Pharmacoeconomics and Outcomes Research.

The system of translation and back-translation recommended in the literature encompasses translation, revision and systematic discussion of the content of the questionnaire by the group of investigators; cognitive debriefing of patients; and back-translation to the original language (Figure 1). Word-by-word translation is not the goal; rather, meaning-by-meaning conversion is used to ensure clarity in the final instrument created in language in common use.

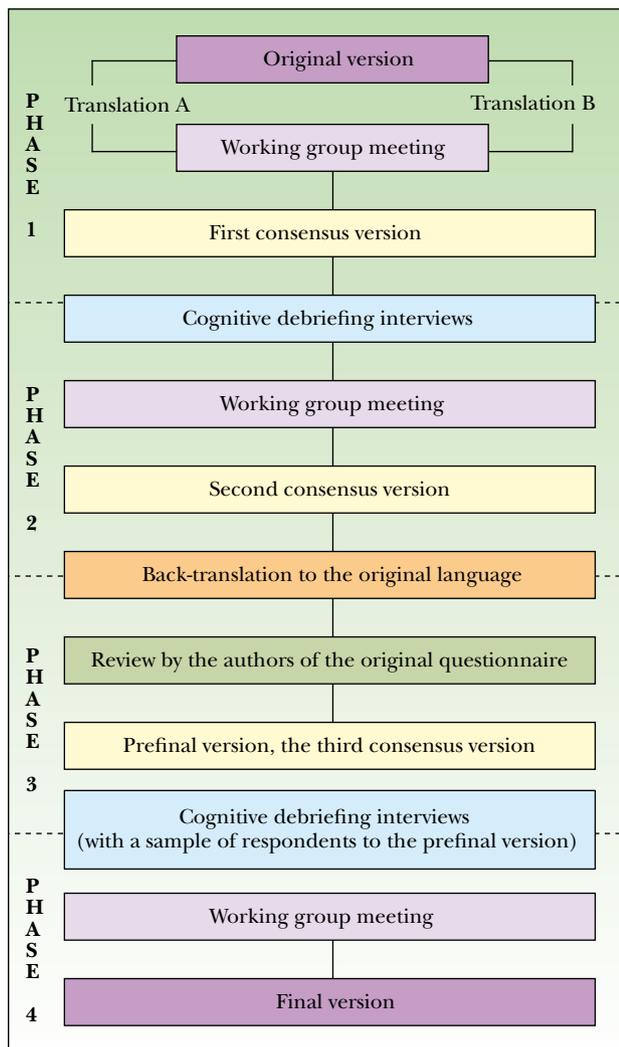


Figure 1. Flowchart showing the process of cross-cultural adaptation of the Nordic Occupational Skin Questionnaire from English to Castilian and Catalan

The working group charged with the cultural adaptation of the questionnaire met 3 times during the process in order to discuss and come to a consensus about individual items of each version, with each meeting lasting up to 4 hours.

An independent person conducted interviews for cognitive debriefing of representatives of the target population to check how patients understood the words and phrases and to improve and facilitate the formulation of questions and adapt them by using colloquial terms in common use. The interviewer obtained the volunteers' informed consent following an explanation of the characteristics of the questionnaire and its purpose. A sample of 5 to 10 individuals, most of whom have the disease in question, is considered adequate for this type of study. During the interview relevant comments were elicited and recorded in qualitative terms until a saturation point was reached. The ideal sample should be diverse with

D5. When did you last have eczema on your hands, wrists or forearms?
(one answer in each column if applicable)

	Hand eczema	Wrist/forearm eczema
I have it just now	3	3
Not just now but within the past 3 months	4	4
Between 3-12 months ago	5	5
More than 12 months ago	6	6

In which year was the last time? (make your best estimate)

_____ (year) _____ (year)

D5. ¿Cuándo fue la última vez que tuvo eccema en las manos, muñecas o antebrazos?
(una respuesta por columna si procede)

	Eccema en mano	Eccema en muñeca
Lo tengo precisamente ahora	3	3
Ahora no, pero sí durante los últimos 3 meses	4	4
Hace entre 3 y 12 meses	5	5
Hace más de 12 meses	6	6

¿En qué año fue la última vez que tuvo eccema?

_____ (año) _____ (año)

Figure 2. Item in which the literal translation of the question was considered sufficient. This item was therefore judged to be an equivalent one.

respect to social and demographic characteristics such as age, sex and, sociocultural level.¹⁸⁻²⁰ Probing questions^{21,22} form the basis of this type of interview.

The participant patients were consenting volunteers with skin problems who attended dermatology clinics at Hospital del Mar IMAS, Barcelona, Spain. Fifteen were interviewed in the first phase for each of the translations and, following reverse translation, 10 more patients were interviewed for each of the language versions (Table 3).

The structured interviews were scripted. Each item was read aloud to the interviewee, who was asked to state what he or she understood. Answer options were also read, and the interviewee was asked to interpret each. Once an item was answered, the patient was asked to explain the meaning of the answer in his or her own words.

This method is more flexible than the think-aloud protocol, in which participants are asked to express their thoughts while they answer the questionnaire, to reveal their mental process as they respond.

Table 3. Demographic, Cultural, and Disease Characteristics of the Patients Interviewed During the First Phase of Cultural Adaptation of the Long Version of the NOSQ-2002 to Castilian

Patient No.	Occupational Dermatitis	Patient Age	Sex	Education
1	Mild eczema	61	Female	Elementary schooling unfinished
2	Severe eczema	26	Male	Elementary schooling unfinished
3	Moderately severe eczema	50	Male	Elementary schooling
4	Mild chronic urticaria	33	Female	Elementary schooling
5	Mild chronic urticaria	19	Female	First phase of secondary schooling
6	Moderately severe eczema	34	Female	Elementary schooling
7	Mild eczema	43	Female	First phase of secondary schooling
8	Mild eczema	75	Female	Elementary schooling
9	No	64	Male	Second phase of secondary schooling
10	Mild eczema	50	Female	First phase of secondary schooling
11	Moderately severe eczema	58	Male	Elementary schooling
12	No	31	Female	Second phase of secondary schooling
13	Atopic dermatitis	36	Female	University
14	Atopic dermatitis	35	Male	University
15	No	43	Female	Elementary schooling

Each interview took between 20 and 45 minutes to complete depending on the participant and his or her disease. Comments were transcribed literally and evaluated by the working group. Commonly used expressions, comments, and comprehension difficulties were recorded.

After the working group's consensus meeting and creation of the second versions, a professional translator was charged with back-translating them to English. The resulting reverse translations were submitted to the original authors for review, and their comments were considered in creating third versions, which entered another round of interviews for cognitive debriefing of respondents.

The final versions of the NOSQ-2002 questionnaire in Castilian and Catalan were discussed at another meeting of the research group to incorporate insights gained from cognitive debriefing.

Results

If items required no modification during translation and cultural adaptation at any point in the process (including consensus meetings for producing either

the first or second versions after cognitive debriefing of interviewees), they were classified as questions for which a literal translation was sufficient. These are termed equivalent items (Figure 2). Eighteen of the 57 items in the NOSQ-2002 were considered equivalent in the Castilian version. Thirty of the 57 were considered equivalent in the Catalan version.

Thirty-nine items (68%) required modification to produce the Castilian questionnaire. This second group of questions were described as ones in which cultural adaptation was necessary. Seven types of necessary modification were identified (Table 4). Five of the 39 modified items required 2 changes: these were F1, U6, U7, U9, D8. Three items (U5, D9, and E7) required 3 changes. (See Figures 3 and 4.) Twenty-five items (43%) were modified in creating the Catalan version (Table 4). Items U1, U5, and F2 required 2 types of change.

Among the modifications deemed necessary, it is noteworthy that the instructions were reduced from 2 pages to 1 page by using a schema.

After reverse translation the original authors suggested that 5 of the 39 modified items (12.8%) in the Spanish version were not culturally equivalent.

A2. Have you ever had "hay fever" or other symptoms of nasal allergy, e.g. from pollens or animals?	
No	1
Yes	2
Don't know	0
A3. Have your eyes ever shown allergic symptoms, e.g. from pollens or animals?	
No	1
Yes	2
Don't know	0
D1. Have you ever had hand eczema?	
No	1
Yes	2
A2. ¿Ha tenido usted alguna vez rinitis alérgica (fiebre del heno) u otros síntomas relacionados con la alergia nasal, por ejemplo, picor nasal, estornudos frecuentes? (por polen, animales u otros)	
No	1
Sí	2
No lo sé	0
A3. ¿Alguna vez sus ojos han mostrado síntomas de alergia, por ejemplo: picor, lagrimeo, enrojecimiento? (por polen, animales u otros)	
No	1
Sí	2
No lo sé	0
D1. ¿Ha tenido alguna vez eccema en las manos? (por eccema se entiende alguno de estos signos en las manos: manchas rojas, ampollas o bolitas de agua, fisuras o grietas que pican o duelen)	
No	1
Sí	2

Figure 3. Questions in which cross-cultural adaptation was considered necessary. A defining phrase was included within the question.

1. The following phrases in the general instructions for use had been omitted: "If you answer 'no' to a framed question, proceed directly to the next framed question. Do not omit any framed questions."
2. The category described as "modifications of design—inclusion of a frame" (U6-U7, D8-D9) was judged inappropriate, as it changed how the questionnaire

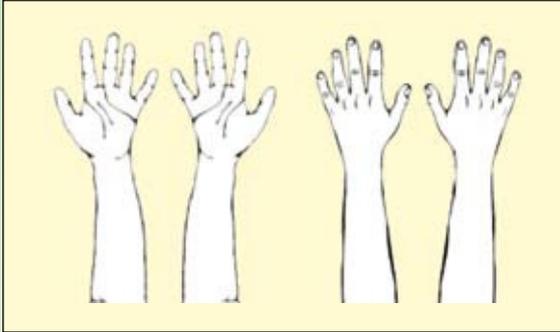
G6. What is your major activity at work? _____	
Since when? _____ (year)	
D3. Shade areas on the hands or forearms where you commonly have eczema? (one or more areas)	
	
G6. ¿Cuál es su principal función o actividad en el trabajo? _____	
¿Desde qué año realiza esta función o actividad?	
D3. Pinte en el dibujo y conteste en qué zonas de las manos y los antebrazos es donde habitualmente se desarrolla su eccema (una o más de un área)	
	

Figure 4. Questions in which cross-cultural adaptation was considered necessary. A word or synonym was inserted into the question.

- was completed and obliged respondents to answer a nonpriority question.
3. For item T2, offering response categories to respondents as options to choose from was rejected as inappropriate because it limited the possible responses.
 4. Item C2 contained a translation error (semantic nonequivalence).

For the Catalan version, the original authors suggested 2 changes, the first in reference to instructions and the second in item C2.

Table 4. Items of the Nordic Occupational Skin Questionnaire-2002 That Were Modified for Cultural Adaptation to Castilian and Catalan, by Type of Change

<i>Castilian Spanish, Modified Items</i>	<i>Items</i>
New categories	G1, G4, G7, T2, E7
Inclusion of a definition	A2, A3, A4, D1, D2
Inclusion of explanatory information	D10, D12, F1, F2, U5, U9, E3, E5
Inclusion of a word or synonym	G6, A1, D3, D4, D7, D9, C2, C3, U1, U2, U3, U4, U5, U6, U7, U8, S1, S2
Inclusion of a new instruction	Before D8 and D9. After item U5. Indication within item U1. Within items E1, E6, E7.
Change of item ordering	F1, C1, E7
Change in design—inclusion of a frame	D8-D9, U6-U7
<i>Catalan, Modified Items</i>	<i>Items</i>
New categories	G1, G4, G7, T2
Inclusion of a definition	A2, A3, A4, D1
Inclusion of explanatory information	C3, F1, F2, E5
Inclusion of a word or synonym	D3, U1, U2, U3, U4, U5, U6, U7, U8, S1, S2, A1
Inclusion of a new instruction	Within item U1. After item U5. Indication within item E1. Indication after item D2. Indication after item F2.
Change in order of information within the item	T3

After the second round of cognitive debriefing interviews it was proposed to modify T3 in the Castilian version. In this version, this item concerns diagnostic methods. In that question, a diagnostic method is first named and then the procedure is described in detail. Insights from cognitive debriefing suggested that the order should be reversed, as the intention was better understood if the explanation of the diagnostic test was given first.

Discussion

This study has allowed us to draft Castilian Spanish and Catalan versions of the generic NOSQ-2002 questionnaire, as the first step toward developing valid measurement instruments. The method used, with certain variations, has been applied in Spain and other European countries to adapt several questionnaires that are useful in public health planning.¹⁶⁻²²

The cultural adaptation of this questionnaire has furthered the development of a survey instrument for work-related skin diseases (such as hand and forearm contact eczema and urticaria) that can facilitate the comparison of study results on an international level and that will be useful for carrying out multicenter studies in different countries.

The rigorous, systematic process we applied ensures that the properties of the measurement tool (reliability, validity, and sensitivity to change) will be similar to those of the original. This process also supports the questionnaire's cross-cultural applicability.

While adapting the NOSQ-2002 for use in Castilian and Catalan, the main difficulty we encountered was that the language register of the original was that of medical professionals. On translation, it had to be made more colloquial so that it could be understood by a population of non-health-care workers. In fact, the researchers who created the NOSQ offer it in professional medical English so that it can be later translated into colloquial forms in any language. The simple formulation of most items, and the fact that the questionnaire does not use colloquial expressions in its original English version, makes translation easier but means that cultural adaptation is required.

Apart from the need to shift the register of the questionnaire into more colloquial language, we encountered no problems in adapting the content of the questions.

Cognitive debriefing of interviewees showed us that comprehension was generally good, although modifications were proposed to clarify expressions and incorporate even more colloquial language and definitions or more familiar synonyms so that questions could be more readily understood.

Contact with the original authors during the process was important for achieving translations that were sufficiently equivalent. After reverse translation of the second Castilian and Catalan consensus versions, the original authors confirmed that these versions adapted for Spain maintained the same content and meaning in each of the items. Very few changes resulted, probably because the process had been rigorous and systematic up to that point.

Using a standardized questionnaire will facilitate research and the development of measures to prevent work-related skin diseases such as hand or forearm contact eczema and contact urticaria.

The NOSQ-2002 is of interest for carrying out surveillance programs for these conditions in the workplace or for follow-up after implementing preventive interventions such as changes in chemicals or work processes or the introduction of personal protection equipment such as gloves.

It is believed that these preventive interventions, whether initiated by a company or introduced by others, could reduce the number of workplace surveillance visits to find cases of hand dermatoses or contact urticaria, thus reducing health care surveillance costs. Examinations would be limited to persons with skin complaints.

This questionnaire will be a good tool for dermatologists, epidemiologists, public health and occupational medicine specialists carrying out research, and will also be useful for family medicine practitioners.

Although we now have Castilian and Catalan versions of the long form of the NOSQ-2002 available at www.arbejdsmiljoforskning.dk and www.ami.dk/NOSQ, it still necessary to develop valid versions of the short questionnaire.

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