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Building a scale for measuring burden of hand eczema: BoHEM

To the Editor: Chronic hand eczema (CHE) results in persistent symptoms that interfere with daily activities, social functioning, and workability.

We failed to find in the literature any specific tool that aimed to assess the burden experienced by patients with CHE. Such a tool would be valuable both for patients and for clinicians who manage patients with CHE daily. Indeed recently, the concept of burden has been given a central role in evaluating patient care.[1] The self-administered

Burden of Hand Eczema (BoHEM) questionnaire was developed by using a standard methodology that included 3 distinct phases: conception, development, and validation.[2] Each phase followed a strict methodologic process involving a multidisciplinary team of dermatologists, patients, and experts in patient-reported outcomes. The original BoHEM questionnaire was developed in French. A linguistic and cross-cultural validation following a previously validated methodology[3] was applied to generate an American English–language version.

The initial conceptual phase involved 15 patients who shared their complaints, perceptions, and experiences in relation to CHE, after which 15 items were retained and used to form the conceptual questionnaire (2 questions were removed because they were not related to a particular factor). Principal component factor exploratory analysis was performed to test the questionnaire's robustness. Through the use of standardized regression analysis, 3 dimensions were highlighted (Table I): daily life (8 questions), perceived appearance to others, (5 questions), and relationships (2 questions). The unidimensionality of the BoHEM questionnaire was confirmed by higher-order factor analysis. The practical model fit indices were acceptable, with a comparative fit index of 0.9531 and a non-normed fit index of 0.9783. The model appeared well adjusted and well fitted, offering the possibility of grouping the 3 dimensions into 1 overall score. With regard to

Table I. Loading of questions on the factors after rotation

Item	Factor 1	Factor 2	Factor 3
I have difficulty performing everyday activities.	**0.65**	0.27	0.05
My professional activities are impacted.	**0.62**	0.38	0.05
I have difficulty grooming (styling hair, washing, shaving).	**0.69**	0.17	0.21
I have had problems at work due to my chronic hand eczema.	**0.65**	0.25	0.08
Daily care for my chronic hand eczema is immensely tiring.	**0.76**	0.04	0.27
It seems to me that my chronic hand eczema is costing me more and more.	**0.70**	0.17	0.22
My chronic hand eczema affects my quality of sleep negatively.	**0.69**	0.23	0.21
I believe that my life would have been different without chronic hand eczema.	**0.61**	0.25	0.28
When I show my hands, the looks from other people embarrass me.	0.32	*0.70*	0.22
I hesitate to shake hands when meeting someone.	0.35	*0.56*	0.15
I tend to keep my hands in my pockets.	0.15	*0.80*	0.15
I don't know where to put my hands anymore when at work.	0.17	*0.82*	0.17
Interacting with others is difficult.	0.41	*0.50*	0.46
I have a troubled emotional life.	0.28	*0.26*	<u>0.84</u>
The appearance of my hands (redness, dryness) affects my sex life.	0.18	0.17	<u>0.86</u>

Loadings (correlation coefficients between questions and factors) are computed to facilitate the interpretability of the factors. A loading greater than 0.5 indicates that the couple question and factor are strongly related to each other. A question that does not display a loading greater than 0.5 is not particularly related to any of the selected factors. The questions in this table are reordered to first show those corresponding to factor 1 (*boldface*), then to factor 2 (*italic*), and lastly to factor 3 (*underlined*). We can now interpret factors by looking at the common theme among questions that belong to the same factor. The total score is obtained by summing the scores for each of the 15 items as follows: never or not applicable is scored as 0; rarely is scored as 1, sometimes is scored as 2, often is scored as 3, very often is scored as 4, and constantly is scored as 5, resulting in a maximum of score of 75 and a minimum score of 0. The higher the score, the greater the importance of the burden of the disease.

Table II. Correlation coefficients between BoHEM score and 4 self-administrated questionnaires

Questionnaire	Pearson correlation coefficients (N = 280), Prob > |r| under H0: Rho = 0					
	CES-D	**SF-12−Physical**	**SF-12−Mental**	**PSS**	**DLQI**	**BoHEM**
CES-D	1	−0.06 (P = .36)	−0.79 (P < .01)	0.78 (P < .01)	0.46 (P < .01)	0.40 (P < .01)
SF-12-Physical	−0.06 (P = .36)	1	−0.14 (P = .02)	0.01(P = .84)	−0.47 (P < .01)	−0.42 (P < .01)
SF-12-Mental	−0.79 (P < .01)	−0.14 (P = .02)	1	−0.67 (P < .01)	−0.43 (P < .01)	−0.37 (P < .01)
PSS	0.78 (P < .01)	0.01 (P = .84)	−0.67 (P < .01)	1	0.36 (P < .01)	0.33 (P < .01)
DLQI	0.46 (P < .01)	−0.47 (P < .01)	−0.43 (P < .01)	0.36 (P < .01)	1	0.79 (P < .01)
BoHEM	0.40 (P < .01)	−0.42 (P < .01)	−0.37 (P < .01)	0.33 (P < .01)	0.79 (P < .01)	1

Significant *P* values indicate that our score is strongly related to validated scores, hence confirming the external score validity with our methodology.
BoHEM, Burden of Hand Eczema; *CES-D*, Center for Epidemiologic Studies Depression Scale; *DLQI*, Dermatology Quality of Life Index; *PSS*, Perceived Stress Scale; *SF-12−Mental*, 12-Item Short Form Health Survey−Mental; *SF-12−Physical*, 12-Item Short Form Health Survey−Physical.

its reliability, the Cronbach alpha coefficient[4] was 0.913 for the entire questionnaire, reflecting its excellent internal coherence. The BoHEM questionnaire correlated highly with other validated questionnaires. The correlation coefficients between the BoHEM questionnaire and validated questionnaires were relatively high, confirming their strong association and thus the BoHEM questionnaire's external validity (Table II). Cognitive debriefing did not result in any major changes to the questions' wording.

Lastly, the test-retest reliability was obtained from 32 evaluable subjects (on day 0 and day 10), showing very good reproducibility. The intraclass correlation of each dimension was greater than 0.88 for each domain. The BoHEM questionnaire's results can be expressed as a total score between 0 (no impact) and 75 (the highest possible impact).

Thus far, there has been no specific instrument available to assess the burden of CHE. The current report provides support of the BoHEM questionnaire's feasibility, reliability, and validity as a specific instrument designed to fill this unmet need. With its 15 items, the BoHEM questionnaire is relatively short and easy to use. The questions are simple and easy to understand, so that it can used by anyone. We hope that the BoHEM questionnaire will serve as a valuable tool for health care providers to better evaluate patients' burden. The BoHEM questionnaire will likely facilitate communication between patients and health care providers, thus creating a real opportunity for the practitioner to better understand the multiple issues faced by patients.

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