

ORIGINAL ARTICLE

CONTACT
DERMATITIS

WILEY

Hand eczema patients' knowledge of skin protection following a guided talk—A retrospective study with a follow-up questionnaire

Yasemin Topal¹  | Tove Agner¹ | Janique van der Heiden¹ | Niels E. Ebbelhøj² | Kim K. B. Clemmensen¹

¹Department of Dermatology, Bispebjerg University Hospital, Copenhagen, Denmark

²Department of Occupational and Environmental Medicine, Bispebjerg University Hospital, Copenhagen, Denmark

Correspondence

Yasemin Topal, Department of Dermatology, Bispebjerg University Hospital, 2400 Copenhagen, Denmark.
Email: yasemin.topal.01@regionh.dk

Abstract

Background: Several studies have assessed the effect of patient education regarding hand eczema (HE) severity and quality of life. Few studies, however, have evaluated patients' knowledge.

Objectives: To examine knowledge of skin protection in HE patients following a guided talk, and to identify variables associated with knowledge.

Methods: HE patients referred to the outpatient dermatological clinic, Bispebjerg Hospital, between January 2013 and July 2014 were offered a guided talk on HE prevention. HE severity and the Dermatology Life Quality Index (DLQI) score were assessed. A questionnaire comprising 10 questions about skin protection was sent 1 to 2.5 years later.

Results: One hundred and twenty patients responded to the questionnaire (response 53.5%). The mean percentage of correct answers was 74.7%. Sixty per cent responded correctly to at least eight questions. Male sex, older age and education for >5 years were associated with a low level of knowledge. Education for 3 to 4 years ($P = 0.045$) was associated with a higher level of knowledge. No significant impact of previous/current atopic dermatitis, HE severity or previous information on skin protection was found with respect to level of knowledge.

Conclusions: Females and patients with education for 3 to 4 years showed the highest level of knowledge, whereas males, older patients and patients with education for >5 years should be brought more into focus in skin protection programmes.

KEYWORDS

education, hand eczema, knowledge, prevention

1 | INTRODUCTION

Hand eczema (HE) is a frequent skin disorder with a lifetime prevalence of 15% in the general population.¹ In Denmark, it is the most commonly recognized occupational disease,² affecting females twice as often as males.³ Disease duration is variable, and symptoms may

recur after asymptomatic periods; however, a chronic course is characteristic, with an average duration of >10 years.^{1,4} Symptoms may vary from mild to severe, affecting the patients' quality of life (QoL) to the same extent as for patients with psoriasis and asthma.^{5,6} The long-term prognosis has been shown to be poor, and the disease can result in sick leave, job changes, and early retirement.^{4,7} Taken

together, the financial implications are considerable for both the patient and society.^{8,9} Previous studies have indicated that these negative consequences might be reduced by optimizing patients' knowledge of skin protection through an educational programme.^{10–12} An important part of HE treatment is daily skin care and protection, and the primary responsibility for the management and maintenance of these daily routines lies with the patient. In this regard, it is essential for the patient to be educated about skin protection. Several intervention studies have assessed the effect of patient education regarding eczema severity and QoL^{11,13,14}; however, only a few studies have evaluated patients' knowledge of HE treatment and prevention as the primary outcome.^{12,15–17} The aims of the present study were to examine knowledge of skin protection and treatment in a sample of HE patients, 1 to 2.5 years after their participation in a guided talk on skin protection, and assess the associations with sex, age, atopy, HE severity, QoL, and level of education.

2 | METHODS

HE patients referred to the outpatient dermatological clinic, Bispebjerg University Hospital, Copenhagen, Denmark, between 1 January 2013 and 1 July 2014 were eligible for the study. Further inclusion criteria were sufficient proficiency in the Danish language to answer a written questionnaire, and age ≥ 16 years.

In accordance with the routine of the clinic, the patients at the initial visit had both a consultation with a dermatologist, including planning of patch testing, and a guided talk by a nurse. The guided talk had a duration of up to 20 minutes, during which a nurse informed and instructed the patient in skin protection and HE prevention according to a written template.¹⁸ The nurses were experienced with communication, and the guided talks were initially supervised by a dermatologist. The recommendations comprised evidence-based instructions concerning HE treatment, preventive measures during wet work such as the use of gloves, and other preventive factors. HE severity was assessed by the dermatologist using the Hand Eczema Severity Index (HECSI),¹⁹ and QoL was assessed by use of the Dermatology Life Quality Index (DLQI) questionnaire.²⁰

A follow-up questionnaire was sent to all patients in July 2015, that is, 1 to 2.5 years after their first visit to the outpatient clinic. If there was no response, a reminder was sent up to two times. The questionnaire covered the following items: atopy, patch testing, QoL, improvement/deterioration of HE, educational level, current occupational status and knowledge of skin protection,²¹ and whether they had actually participated in the guided talk. Information on atopic dermatitis was assessed with a validated question on previous or current atopic dermatitis,²² and a question on whether the patients had one or more positive patch test reactions was also included, as well as the DLQI questionnaire. The participants had to rate whether their HE was the same, had improved or had deteriorated since their first visit to the dermatological clinic. The educational level was grouped into five categories in the questionnaire, whereby the patients had to mark the highest educational level attained. Knowledge of skin protection

was examined through 10 multiple choice questions on the basis of 10 recommendations usually given to HE patients in Denmark (Figure 1).^{18,23,24} The questions on knowledge are shown in Table 2.

For statistical analysis, the Kruskal-Wallis test was applied to evaluate the differences between the respondents and non-respondents with respect to sex and age. The χ^2 test was performed to test for differences in correct answers between males and females. The assumptions for parametric testing were not met; therefore, the non-parametric Mann-Whitney *U* test and Kruskal-Wallis test were used to compare differences in knowledge between men and women, age, and educational groups, etc. Patients' DLQI scores were categorized into two groups: one group with no/small effect on QoL, with a DLQI score of ≤ 5 , and the other group with a moderate/large effect on QoL, with a DLQI score of >5 .^{13,25} Regarding the HECSI, the division was made between HECSI = 0, corresponding to no present eczema, and HECSI ≥ 1 , indicating present eczema symptoms. In the analysis, the five educational levels were summarized into three educational groups, as follows: education group 1—unskilled profession, skilled profession, and higher education for 1 to 3 years; education group 2—higher education for 3 to 4 years; and education group 3—higher education for ≥ 5 years. To evaluate the influence of sex, age and educational level on knowledge, a binomial logistic regression was performed by dichotomizing the total score of correct answers into: high level of knowledge (8–10 correct answers) and low level of knowledge (0–7 correct answers). Unanswered questions or more than one answer to a question regarding skin protection were considered to be incorrect. Two-sided *P*-values of <0.05 were considered to be statistically significant. Data were analysed with SPSS statistical software version 22.0.

3 | RESULTS

In the defined period, 226 individuals with HE were eligible for the study. After two reminders, 121 individuals answered the questionnaire, giving a response rate of 53.5%. One patient was excluded afterwards, resulting in a total of 120 patients (76 females and 44 males). The mean age among respondents was 47.2 years

1. Use protective gloves when performing wet-work tasks
2. Protective gloves should be used when necessary but for as short a time as possible
3. Protective gloves should be intact and clean and dry inside
4. When using protective gloves for more than 10 min wear a cotton glove underneath
5. Wash your hands in lukewarm water. Rinse and dry them thoroughly after washing
6. Hand washing may be substituted by the use of disinfectant when the hands are not visibly dirty
7. Do not wear rings at work
8. Select a moisturizer that is lipid-rich and fragrance-free
9. Apply moisturizers on the whole hand. Apply moisturizer on your hands during the workday or after work
10. Take care also when you do domestic work and use warm gloves when going outside in winter

FIGURE 1 Ten recommendations about skin protection given in Denmark¹⁸

(± 15.6 years), which was significantly higher than that among non-respondents, who had a mean age of 40.6 years (± 13.5 years) ($P = 0.002$). There was no significant difference in relation to sex among respondents and non-respondents. Of the 120 participants, 108 (92.5%) reported that they had participated in the guided talk with a nurse.

Twenty-nine participants (24.2%) reported previous or current atopic dermatitis, and 109 patients reported that they had been patch tested at the hospital, of whom 46.7% had one or more positive results (Table 1). DLQI and HECSI scores were registered at baseline for 87 patients; the mean DLQI score was 5.5 (SD ± 5.7) and the mean HECSI score was 15.6 (SD ± 25.5), with no significant differences between males and females. At follow-up 1 to 2.5 years later, DLQI was also assessed by use of the questionnaire; the mean DLQI score was 4.2 (SD ± 5). A total of 61.2% reported improved HE, 6.9% reported deteriorated HE, and the rest reported no change in their HE since their first visit to the hospital clinic.

The overall percentage of correct answers concerning the 10 questions about skin protection was 74.7%. Two patients had one correct

answer only, whereas 18.3% responded correctly to all questions. Eighty-five per cent of the participants had five correct answers or more, and 60% had eight correct answers or more. Generally, more females than males answered correctly to almost all questions (Tables 1 and 2). Male sex was statistically significantly associated with a low level of knowledge in the crude, but not in the adjusted multivariate analysis (crude odds ratio [OR] = 2.23, 95% confidence interval [CI]: 1.04–4.78; adjusted OR = 1.68, 95%CI: 0.73–3.84) (Table 3). Knowledge was not found to be associated with age in the univariate analysis (Table 2), whereas increasing age was associated with a low level of knowledge in the adjusted multivariate analysis (adjusted OR = 1.03, $P = 0.045$) (Table 3). Previous or current atopic dermatitis and having a contact allergy did not influence the level of knowledge (Table 2). There was a trend for high baseline QoL (low DLQI score) to be associated with a higher level of knowledge at follow-up ($P = 0.054$). The mean number of correct answers in patients who had participated in the guided talk was 7.6 (SD ± 2.2), as compared with 6.44 (SD ± 2.8) in the nine patients who had not received the guided talk on prevention of HE. There was a significant

TABLE 1 Questionnaire about knowledge of skin protection with answers (English translation)

Question	Correct answer	Male (N = 44) (36.7%), n (%)	Female (N = 76) (63.3%)	P-value*	Total (N = 120), n (%)
A) Which of the following statements concerning moisturizers do you believe is correct?	<i>The moisturizer should be used frequently, as it is an important treatment for the skin condition</i>	33 (75)	66 (86.8)	0.1	99 (82.5)
B) Which of the following statements about protective gloves (rubber, nitrile and plastic gloves) do you believe is correct when you have hand eczema?	<i>One should wear protective gloves during wet or dirty work and when handling food (cooking)</i>	27 (61.4)	65 (85.5)	0.003	92 (76.7)
C) Do you want to reuse disposable gloves?	<i>No, never</i>	31 (70.5)	61 (80.3)	0.22	92 (76.7)
D) Does it have any negative significance that you have rings if you have hand eczema?	<i>Yes</i>	23 (52.3)	53 (69.7)	0.056	76 (63.3)
E) For washing of hands, what temperature should the water have?	<i>Cold/lukewarm</i>	34 (77.3)	61 (80.3)	0.70	95 (79.2)
F) When should you use hand disinfectant (hand spray) rather than soap and water?	<i>When there is no visible dirt on the hands</i>	26 (59.1)	51 (67.1)	0.38	77 (64.2)
G) When should you wear cotton gloves under protective gloves (rubber, nitrile or plastic gloves)?	<i>When wearing gloves for more than 10 minutes</i>	21 (47.7)	43 (56.6)	0.35	64 (53.3)
H) Which of the following statements do you think is correct? (only the correct statement is shown here)	<i>Use gloves outdoors in cool weather to protect your hands against becoming dry</i>	25 (56.8)	63 (82.9)	0.002	88 (73.3)
I) What moisturizer or ointment should you use for your hands to prevent or treat hand eczema?	<i>A moisturizer without perfume and with a high fat content</i>	41 (93.2)	68 (89.5)	0.50	109 (90.8)
J) Where on the hands should the moisturizer be applied?	<i>On the whole hand</i>	34 (77.3)	69 (90.8)	0.041	103 (85.8)

Percentages of correct answers for males, females and the total are given. The correct answers are shown in italic; wrong answer choices are not shown. For estimation of differences between correct answers of males and females, the χ^2 test was used.

*Significant P-values are shown in bold.

TABLE 2 Mean values of total number of correct answers for different groups

	Number (%)	Mean of total correct answers $\pm$ SD	P-value*
Total	120	7.47 $\pm$ 2.2	
Information from baseline			
DLQI at baseline	87 ^a		0.054
≤ 5 (no effect-small effect)	55 (63.2)	8.0 $\pm$ 1.7	
> 5 (moderate-extremely large effect)	32 (36.8)	7.0 $\pm$ 2.3	
HECSI	87 ^a		0.78
No eczema (HECSI = 0)	18 (20.7)	7.6 $\pm$ 1.9	
With eczema (HECSI ≥ 1)	69 (79.3)	7.7 $\pm$ 2.0	
Information from questionnaire			
Sex			0.010
Male	44 (36.7)	6.7 $\pm$ 2.5	
Female	76 (63.3)	7.9 $\pm$ 1.9	
Age (y)			0.096
Age group 1 (18-34)	30 (25)	7.7 $\pm$ 1.5	
Age group 2 (35-54)	49 (40.8)	7.96 $\pm$ 2.0	
Age group 3 (55-90)	41 (34.2)	6.7 $\pm$ 2.8	
Atopic dermatitis			0.15
No atopic dermatitis	91 (75.8)	7.3 $\pm$ 2.4	
Previous or current atopic dermatitis	29 (24.2)	8.1 $\pm$ 1.5	
Patch test	101 ^b		0.55
Positive	56 (46.7)	7.77 $\pm$ 2.1	
Negative	45 (53.3)	7.5 $\pm$ 2.2	
DLQI at follow-up	115 ^c		0.32
≤ 5 (no effect-small effect)	88 (76.5)	7.69 $\pm$ 2.1	
> 5 (moderate-extremely large effect)	27 (23.5)	7.3 $\pm$ 2.2	
HE at follow-up	116 ^d		0.71
Improved	71 (61.2)	7.6 $\pm$ 2.2	
The same	37 (31.9)	7.2 $\pm$ 2.3	
Deteriorated	8 (6.9)	7.9 $\pm$ 1.6	
Guided talk by nurse	117 ^e		0.21
Participated	108 (92.3)	7.6 $\pm$ 2.2	
Did not participate	9 (7.7)	6.44 $\pm$ 2.8	
Education	117 ^e		0.006
Education group 1 (≤ 3 y)	43 (36.8)	7.3 $\pm$ 1.9	
Education group 2 (3-4 y)	55 (47.0)	8.1 $\pm$ 2.2	
Education group 3 (≥ 5 y)	19 (16.2)	6.7 $\pm$ 2.4	

Abbreviations: DLQI, Dermatology Life Quality Index; HE, hand eczema; HECSI, Hand Eczema Severity Index.

The number of questions on knowledge was 10. Statistical differences were estimated with the Mann-Whitney U test or the Kruskal-Wallis test.

*Significant P-values and odds ratios are shown in bold.

^a87 valid cases.

^b101 valid cases.

^c115 valid cases.

^d116 valid cases.

^e117 valid cases.

difference in the level of knowledge between the three educational groups, with the lowest number of correct answers being seen in the most highly educated group ($P = 0.006$) (Table 2). Education group 2 was negatively associated with a low level of knowledge (adjusted

OR = 0.4, 95%CI: 0.17-0.98) (Table 3). As healthcare workers constituted a substantial proportion of the total group of HE patients, knowledge in healthcare workers and non-healthcare workers was compared. Healthcare workers had a significantly higher number of

TABLE 3 Multivariate analysis comparing low knowledge with high knowledge

Low knowledge outcome	TotalN = 117 ^a		Crude		Adjusted ^b	
	High level of knowledge (n = 72)	Low level of knowledge (n = 45)	OR (95%CI)	P-value*	OR (95%CI)	P-value*
Sex						
Female (reference)	51	23	1	-	1	-
Male	21	22	2.23 (1.04-4.78)	0.038	1.68 (0.73-3.84)	0.22
Age (y)	72	45	1.03 (1.01-1.06)	0.017	1.03 (1.00-1.05)	0.045
Education						
Education group 1 (reference)	23	20	1	-	1	-
Education group 2	41	14	0.39 (0.17-0.92)	0.032	0.40 (0.17-0.98)	0.045
Education group 3	8	11	1.58 (0.53-4.70)	0.41	1.33 (0.43-4.14)	0.62

Abbreviations: CI, confidence interval; OR, odds ratio.

High level of knowledge: 8 to 10 correct answers. Low level of knowledge: 0 to 7 correct answers.

Binomial logistic regression analysis with ORs for patients with a low level of knowledge as compared with patients with a high level of knowledge.

*Significant P-values and odds ratios are shown in bold.

^a117 valid cases.

^bAdjusted for sex, age, and educational level.

correct answers (8.91 ± 1.2) than patients in other occupations (7.44 ± 2.3) and patients outside the labour market at follow-up (6.71 ± 2.2) ($P < 0.001$). Of all healthcare workers, 87% were women and 73.9% were in education group 2.

4 | DISCUSSION

In the present study, we assessed knowledge on HE prevention and treatment in a group of HE patients recruited from an outpatient dermatological clinic who had all been offered educational guidance. At follow-up after 1 to 2.5 years, we found an overall percentage of correct answers to 10 questions regarding HE prevention of 74.7%, which is very similar to the percentage of correct answers (73%) in a previous study including patients with occupational HE,¹⁵ and we found that 85% of the patients had responded correctly to half of the questions or more. High QoL at baseline, young age and education for 3 to 4 years were all variables associated with a high level of knowledge, as was female sex, although this was not statistically significant in the adjusted analysis.

Differences in educational background and profession might explain the difference in knowledge between males and females. In a Danish study including 1000 patients with contact dermatitis, the highest-ranking female risk occupation, which was hairdressing, was not even represented in the top 10 risk professions for men.²⁶ In this study, the majority of the women were employed in high-risk occupations regarding HE, which potentially could strengthen their knowledge of HE prevention, as they might have received preventive information in relation to their work.^{27,28} A significant difference between the sexes regarding knowledge of skin protection was also previously reported by Fisker et al,¹⁵ and our data support the greater need for guidance among males than among females.

It is of note that there was a significant difference in the level of knowledge between men and women with respect to emollient usage. Whereas almost 90% of the females knew that the moisturizer should be applied on the whole hand, only three quarters of the males were aware of this ($P = 0.041$). Studies have previously reported more use of emollients and other topical treatments among females than among males, and it has been suggested that males may regard emollients as cosmetics.^{29,30}

Increasing age was associated with a low level of knowledge in the logistic regression analysis, with the lowest level of knowledge being seen in the oldest age group. Similar results were previously reported for patients with occupational HE, in whom an age of >50 years was found to be significantly associated with a lower level of knowledge.¹⁵ On the basis of this result, we suggest that the guided talk should be designed differently according to age groups, as ways of learning may potentially change with age.³¹

Of the 120 individuals, nine stated that they had not participated in the nurse-led guided talk on skin protection and treatment, and three did not answer the question. The nine individuals had less knowledge than the other participants; however, even though this indicates that the guided talk has an impact on the level of knowledge, this is not definite, as the group not receiving the guided talk was very small, and because it is possible that a few of these patients might not remember having the conversation with the nurse.

Increased knowledge among atopic dermatitis patients could be expected, as they might have received pre-occupational guidance regarding skin care, owing to the increased risk of HE.³²⁻³⁵ However, we found that atopic dermatitis was not associated with knowledge, supporting previous findings reported by Fisker et al.¹⁵ Having a positive patch test reaction could also be expected to increase the patients' awareness and knowledge regarding skin protection; however, this was not supported in the present study.

We found a borderline significant association between a high level of knowledge and high QoL (ie, low DLQI scores) at baseline; however, this association was not observed when DLQI at follow-up was correlated with knowledge, making interpretation difficult. Regarding self-reported improvement of HE at follow-up, it could be assumed that this was associated with a high degree of knowledge. However, this was not supported by our study, which could be explained by the fact that knowledge of skin protective factors does not necessarily correspond to the behaviour of the patient or to the eczema outcome. The practical instructions might be experienced as highly demanding, stigmatizing, and/or frustrating.³⁶ A recent randomized controlled trial found improvements in occupational HE patients' knowledge and behaviour score after a group counselling programme, but the behaviour did not influence HE severity significantly.¹⁷ Ibler et al reported a significant reduction in HECSI score and increased use of protective gloves after an educational programme for healthcare workers; however, no difference with respect to knowledge was observed between the intervention group, which received the educational programme, and the control group.¹¹

Education group 2 (education for 3-4 years), which, among others, comprised healthcare workers, hairdressers, and people working in other high-risk occupations, in relation to the development of HE, showed the highest level of knowledge. Healthcare workers constituted 30.9% of education group 2, and, as the level of knowledge was higher among healthcare workers than in the rest of the study population, this explains the high level of knowledge in education group 2. The fact that education group 3, with the highest educational level, had the lowest degree of knowledge regarding skin care supports previous findings.¹⁵ This group of patients might have less trust in the authorities, and might also seek information independently, which was also reported in a recent study.³⁷

Strengths of the study were the accessibility of clinical data obtained with the HECSI and the DLQI at baseline, and the long follow-up period of 1 to 2.5 years. However, it is a limitation that the follow-up period differed, as Graversgaard et al have shown that the level of knowledge about HE decreases over time.³⁸ Nearly all patients participated in the guided talk by a nurse, and the information on the patient's history of atopic dermatitis was obtained by means of a validated question in the questionnaire. Other limitations of the study were the relatively small study population and the relatively low response rate of 53.1%, as compared to 73% in the study of Fisker et al.¹⁵ However, there are few clinical follow-up studies on HE patients. The non-respondents were significantly younger, and they might have had a higher or a lower level of knowledge than the respondents, potentially resulting in respondent bias. The participants could use different sources, such as the internet, to obtain the correct answers when answering the questionnaire. However, as only 22 individuals answered all questions correctly, this possibility might not have been exploited by the majority. Another limitation of the study concerns the ability to recall symptoms, which might result in recall bias.

Data on the relationship between the knowledge and behaviour of the patients were not available in the present study, but would be

interesting to explore in future intervention studies. A recent intervention study by Fisker et al showed that an educational programme involving skin protection given independently of the participant's background had a negative impact on the level of knowledge of healthcare workers regarding HE.¹³ In future studies, it might be of interest to study the effect of tailoring the programme to the individual participant. Moreover, the effect of repetitive interventions over time could be examined, as it has been shown that the level of knowledge changes over time.³⁸ Furthermore, health-psychological aspects could be interesting to include in future studies; among these, the transtheoretical model by Prochaska and DiClemente,³⁹ with an evaluation of stages of change in health behaviour, could be of interest. In relation to this, the follow-up duration should be considered thoroughly, as the stages are defined by time intervals.³⁹ Finally, health-psychological models and communication theories could be contemplated when the participants receive an intervention, as their intentions and stage of motivation might influence their health behaviour.⁴⁰⁻⁴²

In conclusion, the results of the present study show that 60% of HE patients who had received the guided talk responded correctly to a minimum of 8 out of 10 questions regarding HE prevention. This shows that there is still room for improvement. Females and patients with higher levels of education (3-4 years), constituting the healthcare workers, showed the best knowledge, whereas attention should be paid to males, older patients and the most highly educated patients (>5 years) when information about skin protection is given.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

ORCID

Yasemin Topal  <https://orcid.org/0000-0003-1289-1827>

REFERENCES

1. Thyssen JP, Johansen JD, Linneberg A, Menné T. The epidemiology of hand eczema in the general population—prevalence and main findings. *Contact Dermatitis*. 2010;62:75-87.
2. Halkier-Sørensen L. Occupational skin diseases. *Contact Dermatitis*. 1996;35(1 Suppl):1-120.
3. Montnémy P, Nihlén U, Löfdahl CG, Nyberg P, Svensson Å. Prevalence of hand eczema in an adult Swedish population and the relationship to risk occupation and smoking. *Acta Derm Venereol*. 2005;85:429-432.
4. Meding B, Wrangsjö K, Järvholm B. Fifteen-year follow-up of hand eczema: persistence and consequences. *Br J Dermatol*. 2005;152:975-980.
5. Moberg C, Alderling M, Meding B. Hand eczema and quality of life: a population-based study. *Br J Dermatol*. 2009;161:397-403.
6. Agner T, Andersen KE, Brandão FM, et al. Hand eczema severity and quality of life: a cross-sectional, multicentre study of hand eczema patients. *Contact Dermatitis*. 2008;59:43-47.
7. Dannaker CJ, Maibach HI. The prognosis of contact dermatitis. *J Am Acad Dermatol*. 1990;23:300-307.

8. Fowler JF, Ghosh A, Sung J, et al. Impact of chronic hand dermatitis on quality of life, work productivity, activity impairment, and medical costs. *J Am Acad Dermatol*. 2006;54:448-457.
9. Diepgen TL, Scheidt R, Weisshaar E, John SM, Hieke K. Cost of illness from occupational hand eczema in Germany. *Contact Dermatitis*. 2013;69:99-106.
10. Carøe TK, Ebbelhøj NE, Bonde J, Flachs EM, Agner T. Hand eczema and wet work: dose-response relationship and effect of leaving the profession. *Contact Dermatitis*. 2018;78:341-347.
11. Ibler KS, Jemec GBE, Diepgen TL, et al. Skin care education and individual counselling versus treatment as usual in healthcare workers with hand eczema: randomised clinical trial. *BMJ*. 2012;345:e7822-e7822.
12. Held E, Mygind K, Wolff C, Gyntelberg F, Agner T. Prevention of work related skin problems: an intervention study in wet work employees. *Occup Environ Med*. 2002;59:556-561.
13. Fisker MH, Ebbelhøj NE, Vejlstrup SG, et al. Prevention of hand eczema: effect of an educational program versus treatment as usual—results of the randomized clinical PREVEX trial. *Scand J Work Environ Health*. 2018;44:212-218.
14. van Gils RF, Boot CRL, Knol DL, et al. The effectiveness of integrated care for patients with hand eczema: results of a randomized, controlled trial. *Contact Dermatitis*. 2012;66:197-204.
15. Fisker MH, Ebbelhøj NE, Jungersted JM, Agner T. What do patients with occupational hand eczema know about skin care? *Contact Dermatitis*. 2013;69:93-98.
16. Clemmensen KKB, Randbøll I, Ryborg MF, Ebbelhøj NE, Agner T. Evidence-based training as primary prevention of hand eczema in a population of hospital cleaning workers. *Contact Dermatitis*. 2015;72:47-54.
17. Fisker MH, Agner T, Sørensen JA, et al. Simple, low-cost group-counselling programme vs treatment as usual for patients with newly notified occupational hand eczema—exploratory analyses of effects on knowledge, behaviour and personal resources of the randomized PREVEX clinical trial. *Contact Dermatitis*. 2018;79:127-135.
18. Agner T, Held E. Skin protection programmes. *Contact Dermatitis*. 2002;47:253-256.
19. Held E, Skoet R, Johansen JD, Agner T. The hand eczema severity index (HECSI): a scoring system for clinical assessment of hand eczema. A study of inter- and intraobserver reliability. *Br J Dermatol*. 2005;152:302-307.
20. Zachariae R, Zachariae C, Ibsen H, Touborg Mortensen J, Christian WH. Dermatology life quality index: data from Danish inpatients and outpatients. *Acta Derm Venereol*. 2000;80:272-276.
21. van der Heiden J, Agner T, Rustemeyer T, Clemmensen KKB. Hyperkeratotic hand eczema compared to other subgroups of hand eczema—a retrospective study with a follow-up questionnaire. *Contact Dermatitis*. 2018;78:216-222.
22. Stenberg B, Lindberg M, Meding B, Svensson Å. Is the question “Have you had childhood eczema?” useful for assessing childhood atopic eczema in adult population surveys? *Contact Dermatitis*. 2006;54:334-337.
23. Menné T, Veien N, Sommerlund M, Johansen J. Hand eczema. Operational guidelines for investigation and treatment [Internet]. Danish Contact Dermatitis Group. p. 1-12. <https://www.videncenterforallergi.dk/kliniske-retningslinjer/udredning-og-behandling/kliniske-retningslinjer-haandeksem/> accessed May 8, 2019.
24. Hand Eczema [Internet]. Knowledge Center for Allergy, Gentofte Hospital. Danish Contact Dermatitis Group. 2017. pp. 1-4. <https://www.videncenterforallergi.dk/kliniske-retningslinjer/patientinformation/patientinformation-haandeksem/>, accessed May 8, 2019.
25. Hongbo Y, Thomas CL, Harrison MA, Salek MS, Finlay AY. Translating the science of quality of life into practice: what do Dermatology Life Quality Index scores mean? *J Invest Dermatol*. 2005;125:659-664.
26. Schwensen JF, Friis UF, Menné T, Johansen JD. One thousand cases of severe occupational contact dermatitis. *Contact Dermatitis*. 2013;68:259-268.
27. The Danish Working Environment Authority. Instructive measures for primary exposure to epoxy resins and isocyanates. At-instruction C.0.7. [Internet]. 2001. p. 1-8. <https://amid.dk/regler/at-vejledninger/epoxyhar-pikser-isocyanater-c-0-7/>, accessed May 8, 2019.
28. Gloves. Guidance about use of chemicals, microorganisms and wet work. Working environment in the industry. [Internet]. 2009. Available from: https://www.bfa-i.dk/media/4681103/285325-handskevejledning_web.pdf
29. Møllerup A, Veien NK, Johansen JD. An analysis of gender differences in patients with hand eczema—everyday exposures, severity, and consequences. *Contact Dermatitis*. 2014;71:21-30.
30. Noiesen E, Munk M, Larsen K, Høyen M, Agner T. Gender differences in topical treatment of allergic contact dermatitis. *Acta Derm Venereol*. 2009;89:79-81.
31. Harada CN, Love MCN, Triebel K. NIH public access. *Clin Geriatr Med*. 2013;29:737-752.
32. Sherson D, Schlünssen V, Hansen KS, et al. Your job, your choice, your opportunities. If you have asthma. If you have hay fever. If you have eczema. *Danish Health Med Auth*. 2011;1:16.
33. Mortz CG, Bindslev-Jensen C, Andersen KE. Hand eczema in the Odense adolescence cohort study on atopic diseases and dermatitis (TOACS): prevalence, incidence and risk factors from adolescence to adulthood. *Br J Dermatol*. 2014;171:313-323.
34. Ruff SMD, Engebretsen KA, Zachariae C, et al. The association between atopic dermatitis and hand eczema: a systematic review and meta-analysis. *Br J Dermatol*. 2018;178:879-888.
35. Johannisson A, Pontén A, Svensson Å. Prevalence, incidence and predictive factors for hand eczema in young adults—a follow-up study. *BMC Dermatol*. 2013;13:14. <https://doi.org/10.1186/1471-5945-13-14>.
36. Møllerup A, Johansen JD, Thing LF. Knowledge, attitudes and behaviour in everyday life with chronic hand eczema: a qualitative study. *Br J Dermatol*. 2013;169:1056-1065.
37. Holm JG, Clausen M-L, Agner T, Thomsen SF. Use of complementary and alternative therapies in outpatients with atopic dermatitis from a dermatological university department. *Dermatology*. 2019;235:189-195.
38. Graversgaard C, Agner T, Jemec GBE, Thomsen SF, Ibler KS. A long-term follow-up study of the hand eczema trial (HET): a randomized clinical trial of a secondary preventive programme introduced to Danish healthcare workers. *Contact Dermatitis*. 2018;78:329-334.
39. Prochaska JO, Velicer WF, Velic WF. The transtheoretical model of health behavior change. *J Heal Promot*. 1997;12:38-48.
40. Fishbein M, Ajzen I. *Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research*. Longman Higher Education; 1975. 1-18.
41. Schwarzer R, Luszczynska A. How to overcome health-compromising behaviors: the health action process approach. *Eur Psychol*. 2008;13:141-151.
42. Fishbein M, Cappella JN. The role of theory in developing effective health communications. *J Commun*. 2006;56(Suppl 1):1-17.

How to cite this article: Topal Y, Agner T, van der Heiden J, Ebbelhøj NE, Clemmensen KKB. Hand eczema patients' knowledge of skin protection following a guided talk—A retrospective study with a follow-up questionnaire. *Contact Dermatitis*. 2019;81:117-123. <https://doi.org/10.1111/cod.13264>