

User evaluation of patient counselling, combining nurse consultation and eHealth in hand eczema

Annette Møllerup¹, Gitte Harboe² and Jeanne D. Johansen¹

¹The National Allergy Research Centre, Department of Dermato-Allergology, Copenhagen University Hospital Gentofte, 2900, Hellerup, Denmark and

²Department of Dermato-Allergology, Copenhagen University Hospital Gentofte, 2900, Hellerup, Denmark

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Summary

Background and objective. This study reports the findings from a user evaluation of a counselling programme for hand eczema patients in which face-to-face encounters were supplemented with user access to a new website.

Patients and methods. Patients treated for hand eczema in two different settings were included consecutively. Website utilization was examined by use of the transaction log. Comparisons were made between participants who used the website and those who did not. The patients' perspectives were explored by the use of interviews.

Results. Among potential website users ($n = 140$), 88 patients (63%) had an average of 5.1 site visits. At follow-up, the website users had improved more in quality of life ($p = 0.014$), current burden of disease ($p = 0.053$), and itching ($p = 0.042$). The website users reported more changes in habits than did the non-website users ($p = 0.024$). No differences in clinical severity of hand eczema were found. The interviewees were generally satisfied with the counselling and the website. The strict log-on procedures were considered to be an obstacle to using the site. The consecutive inclusion of participants was considered to be a barrier to engagement in the dialogue forum.

Conclusions. The website users benefited from the website, although this was not substantiated by clinical measurements. The trial design partly hampered website utilization. An initial feasibility study could have been warranted.

Key words: eHealth; everyday life; hand eczema; mixed-methods study; nurse consultation; patient counselling; self-management support; self-monitoring; user evaluation.

Hand eczema is a common disease, and is often related to occupational exposures. The condition persists in many cases, and has been found to impact on quality of life similarly to diseases such as asthma and psoriasis (1). The hands are our primary tools in many everyday tasks.

Hence, not surprisingly, many people find everyday life with hand eczema to be difficult, and the need for a constant focus on skin protection to be tiresome (2).

There has been an increasing focus on workers'/patients' education on hand eczema in recent years. Skin protection programmes have proven to be effective in various occupational groups, such as gut cleaners (3), workers in the dairy industry (4), hairdressing apprentices (5), and healthcare workers (6, 7).

Among individuals with hand eczema, a Dutch integrated care programme improved the clinical severity at 6-month follow-up as compared with usual care. However, the effect was not sustainable after 12 months (8). Interventions combining education and dermatological

Correspondence: Annette Møllerup, National Allergy Research Centre, Department of Dermato-Allergology, Copenhagen University Hospital Gentofte, Kildegårdsvej 28, 2900 Hellerup, Denmark. Tel: +45 29 21 34 03. E-mail: amollerup000@gmail.com

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treatment have been widely implemented in Germany. These interdisciplinary programmes have shown durable effects in follow-up studies after 5 and 10 years (9). As tertiary individual prevention (TIP), the programmes involve 2–3 weeks of inpatient hospitalization and 6 weeks of sick leave to promote skin barrier recovery (10, 11).

This German model is not transferable to Denmark, where hand eczema is treated in outpatient settings. A typical Danish outpatient has two to four medical consultations, each 10–20 min in duration, possibly supplemented by short sessions with a nurse in cases of allergy testing or dermatological therapy. Hence, the 'window of opportunity' as regards face-to-face counselling in the treatment courses differs between the neighbouring healthcare systems. Nevertheless, the TIP programme did inspire a newly developed complex counselling intervention, the Healthy Skin Clinic.

This new programme was a package of counselling and supportive elements, acting as an adjunct to usual dermatological treatment. In the programme, the patients were offered nurse consultations supplemented with user access to a website. The effectiveness of the programme was examined in a randomized clinical trial. The patients allocated to the intervention group had greater clinical improvement and more beneficial behavioural changes at follow-up than the usual care group (12, 13). However, the effects depended substantially on the baseline disease severity and the choice of dermatological treatment. The purpose of the present study was to qualitatively evaluate the overall intervention by exploring the participants' perspectives of the programme. Moreover, we quantitatively evaluated the utilization of the website, on the basis of data derived from the transaction log.

Patients and Methods

Study population

The clinical trial was performed from May 2011 to December 2012 at the dermatological department in Gentofte, a metropolitan university hospital, and at a large private dermatology clinic in Aalborg in the northern region of Denmark. Over a period of 1 year, we invited eligible consecutive patients to participate on the basis of the following liberal inclusion criteria: patients who were aged 18–70 years and diagnosed with hand eczema, who had given informed consent, and who were capable of replying to questionnaires in Danish. The patients were individually randomized, and allocated to either the Healthy Skin Clinic intervention or to usual care comprising the hand-out of a 14-min DVD about hand eczema and written information sheets. The Danish Data

Protection Agency and the Ethics Committee of Capital Region (H-2-2011-007) both approved the conduct of the study.

The outcome variables were obtained at baseline and at 6-month follow-up. The primary outcome was the clinical severity of disease assessed with the Hand Eczema Severity Index (HECSI), with a range from 0 to 360 (14). Self-administered questionnaires provided data of the Dermatology Life Quality Index (DLQI), with a range from 0 to 30 (a higher score indicating a more impaired quality of life) (15). We obtained a subjective measurement of disease severity by use of a visual analogue scale (VAS), with a range from 0 to 10, and self-reported medication adherence, with a range from 4 to 20 (a higher score indicating higher adherence). The participants rated their general self-efficacy on a scale from 0 to 10 (16). Also, data on changes regarding protective behaviour were collected, including a 10-item self-constructed questionnaire addressing self-management issues. Further description of the clinical trial as regards sample size estimation can be found elsewhere (12, 13).

The intervention

An intervention team of four trained nurses and the first author was formed. The pivot of the intervention was the nurse-led counselling, which occurred immediately after the first medical consultation. This involved a dialogue on how widely used recommendations for skin protection and skin care (17) were applicable in the everyday life of the patient. Moreover, the patients were introduced to the website, which was created specifically for the intervention. The website was piloted on 9 outpatients in the hospital setting who had previously participated in focus group interviews prior to the clinical trial (2).

The website had two parallel interfaces. The patients could communicate by using threads in a patient dialogue forum, but each patient also had an individual user interface, which was highly secured. Thus, the patient could safely and asynchronously communicate with the intervention team by using a contact formula. The intervention team did not monitor each user on a regular basis, and nor did the nurses initiate communication with the patient, because the overall focus of the intervention was the patient's self-management. The patients did, however, receive biweekly emails reminding them that they could use the website and, if desired, initiate contact with the team as part of the project.

The website comprised five menus. The first was an individual profile of resources and risks generated by the participant's response to the baseline questionnaire. This profile was developed in order to facilitate a tailored second counselling which was offered along with the next

coming dermatological appointment. The second menu was an electronic log in which the patients were encouraged to self-monitor disease activity. Each registration in the log consisted of a date and a subjective assessment of severity on a scale from 0 to 10 (Fig. 1). Furthermore, the patients could note their present symptoms and reflections on which factors could account for any changes in their condition. The eczema extent could be ticked on a set of displayed hands in an interactive programme, and photographs could be attached. Each registration could then be retrieved at a later point by the patient (and the team) and shown in detail.

The patients could use the website to gain knowledge, both as factual information and as educational videos, in the third menu, or they could engage in quizzes in the fourth menu. In the fifth menu, the patients could access the patient dialogue forum to communicate asynchronously with peers.

A few patients did not use the internet, and they were given a folder with the same information on pamphlets and additional prints designed for a self-monitoring offline version.

The website was developed in accordance with the regulations and requirements of the Danish Data Protection Agency by a designated company; Langtved Data A/S. Data from the website were hosted on a Microsoft™ SQL Server, and SSL encryption was used to transfer data from users to the data management centre. User access was possible on three levels: (i) the patients as primary users, (ii) the intervention team of nurses, who could monitor the individual users, and (iii) the first author and an IT specialist as administrators, who could start up new users. Login to the site was totally restricted, as each login required the use of a so-called two-factor authentication solution, which then prompted a single-use six-digit number. A full transaction log was retrievable, identifying the actual user, which of the system's features had been used, and the specific point in time of the activity.

In the follow-up questionnaire, the patients in the intervention group could state whether they would later participate in evaluative interviews, either in focus groups or individually. We carried out one focus group interview with 6 participants. This session was moderated by the first author, with the presence of a project nurse. Additionally, 7 patients were individually interviewed by the first author. All of the interviews were semi-structured by the use of an interview guide (Table 1). The interviews lasted from 25 to 120 min, and the digitally recorded conversations were then transcribed verbatim by the first author.

In the follow-up questionnaire, the patients were encouraged to freely comment on their project participation. This feedback information added to the qualitative evaluation of the counselling intervention.

Data analysis and statistics

With IBM™ SPSS™ STATISTICS version 19.0 for Windows™, categorical data were analysed by chi-square test and logistic regression. Between-group comparisons of continuous data were analysed with the Mann–Whitney *U*-test if there was a non-normal distribution. A two-sided *p*-value of < 0.05 was considered to be indicative of a statistically significant difference.

We performed a qualitative content analysis with a deductive approach. The transcripts were coded independently by the first and second authors. For this purpose, a coding template based on the features of the counselling programme was used. Codes were then merged into categories and themes, with the interpretations being put forward in discussions between the authors. Relevant quotations that underpinned the interpretations were retrieved, and are presented in this article.

Results

The trial flow chart of the randomized controlled study is shown in Fig. 2. All but two of the patients from the intervention group were registered as users of the website. This gave a total of 140 potential website users. The activity on the website varied widely, with 37% (52/140) of the registered users not logging in at all within the 6-month follow-up. The average login frequency among the 88 patients who used the website on at least one occasion was 5.1, with a minimum of one visit and a maximum of 20 unique logins (Fig. 3).

Comparison between website users and non-website users

When we compared the website users with the non-website users, we found no significant differences regarding history of atopic dermatitis, occupational hand eczema, onset of hand eczema, sick leave within the past year, co-morbidity, private practice versus university hospital, or eczema-related allergies. Neither were there significant group differences regarding sex and age (Table 2) or educational level (data not shown). The website users tended to have more severe hand eczema as clinically assessed with the HECSI at baseline ($p = 0.069$) and self-reported with the VAS_{worst} ($p = 0.071$). Accordingly, the website users were more likely to be prescribed intensified treatment, that is, more than topical steroids

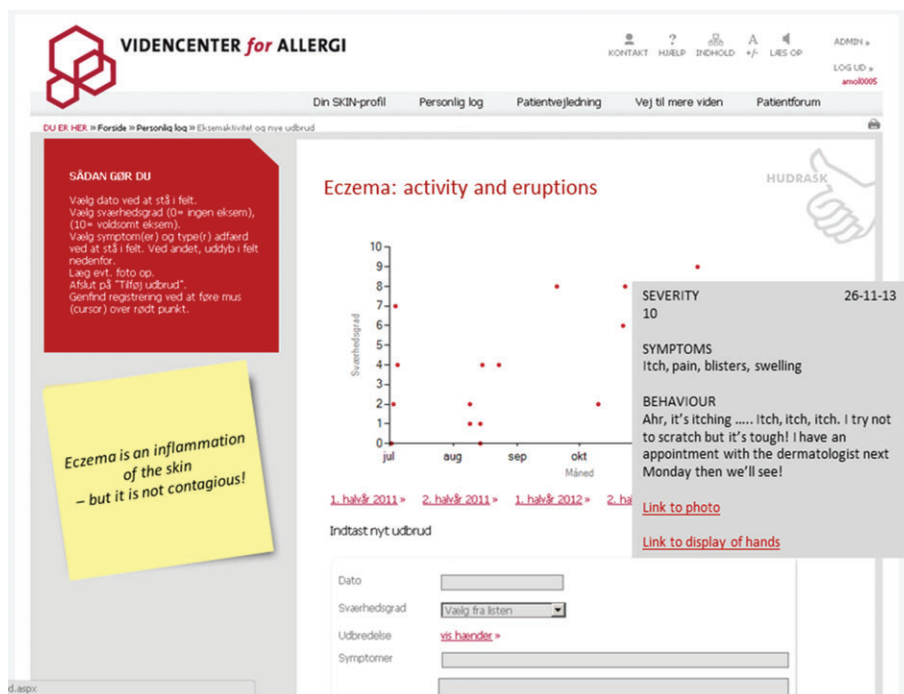


Fig. 1. Screenshot from the self-monitoring electronic log from the Healthy Skin Clinic website, partially translated into English for presentation.

($p=0.052$), and they had more medical consultations ($p=0.002$).

There were no differences between website users and non-website users regarding self-reported medication adherence. Both groups reported high scores on the Danish Medication Adherence Report Scale (DMARS-4) (on a scale from 0 to 20, there were means of 17.4 and 17.6, respectively). Although the difference was not statistically significant, the non-website users had higher baseline values on the general self-efficacy scale (Table 2).

As mentioned above, there was a trend at baseline towards the website users having higher clinical severity than the non-website users, but we found no differences in DLQI, in current VAS, or in the degree of itching within the last 4 weeks (Table 2). At follow-up after 6 months, however, the website users showed significantly greater improvement regarding DLQI, and there was also more improvement in current burden of disease (VAS_{now}) and itching within the last 4 weeks (Table 3).

At follow-up, we explored the confidence and behaviour of the patients regarding hand eczema self-management by use of a 10-item self-constructed questionnaire (Table 4). There was an overall trend towards the website users having a higher composite score of these items ($p=0.093$). In other words, they appeared to be more confident in self-managing their eczema. Moreover, the website users reported significantly more change in habits regarding their hand eczema than did the non-website users ($p=0.024$).

We explored the user traffic of the website among the 88 website users. Of the five main menus, the information site menu was the most frequented, with 67 of the 88 (76.1%) website users looking at one or more information sites. Sixty-three (71.6%) of the website users visited the patient dialogue forum, and 48 (54.5%) of the website users took one or more quizzes. Five participants (3 men and 2 women) communicated with the intervention team via the contact formula.

Findings from the qualitative evaluation

In total, 40 participants from the intervention group agreed to be contacted concerning an interview. Although not intended, all but 1 of the patients who actually went through with an interview were women. Otherwise, the interviewees varied in age, professional background, and number of visits to the website (Tables 5 and 6). Among the participants undertaking the intervention, 36 gave some kind of feedback on the follow-up questionnaire. Table 7 shows relevant data of some of these participants ($n=8$). In the following, as a whole, the interviewees and the participants giving feedback are referred to as informants.

Given the triangulation of data sources, data varied between rich individual descriptions of phenomena to discussions and short statements. The analysis generated two overall themes: to visit the website or not to visit it; and behavioural, learning and supportive outcomes of the counselling programme.

Table 1. Interview guide used for the evaluative interviews

Topic	Question	Elaboration
Introducing question		How has it been to participate in the counselling project?
The face-to-face counselling with the nurse	Structure and conduct	Was the duration of the session adequate?
	Division of roles	Did you experience responsiveness to your needs?
The Healthy Skin Clinic website	Focal points of the session	What are your expectations of patient counselling?
		How was the level of information?
	Use of the website	How was the coherence between the session and the previous medical consultation?
		How has it been using the website? If you did not use it, then why not?
Individualized counselling	The idea of supplementing the face-to-face counselling	Is there a need for supplementation?
	Usability and layout	Can you think of other alternatives?
	The website content	How was the login process?
		How was it to navigate around the site?
Self-monitoring	SKIN profile	How was the level of information?
		Did the website lack information or was some of the information needless?
Communicating with peers	The electronic log	Have you seen your SKIN profile as part of the session?
		How was it to be profiled like this?
Communication	Dialogue forum	Did you use the log and when?
		How has it been to register your symptoms?
	Needs-based communication	Have you learned anything new about your eczema by using the log?
		Are there any negative side-effects of using such a log, e.g. being held in the role as a patient?
Closing question	Regular feedback in the course of treatment	How has it been to be able to be in contact with peers?
		Did you yourself initiate, or contribute to, a thread?
	Closing question	Can a dialogue forum meet one's need to meet peers?
		Have you felt more secure by being able to contact a nurse, even though you haven't used the opportunity?
	Regular feedback in the course of treatment	How has it been to receive reminder emails?
		Is there a need for feedback according to behavioural changes, adapting good habits, and such?
	Closing question	Have you changed your behaviour and your routines in everyday life as a result of your participation in the project?
		Do you want to pass on any insights that you have gained through the project?

The informants used the website very differently, with 4 participants not having visited the site at all. The overall perception was that the Healthy Skin website was informative and a good supplement to the face-to-face counselling. Reasons for not using the site were lack of IT skills, technical problems related to the authentication procedure, and computer breakdown. Moreover, personal problems or lowered energy levels resulting from the disease as such led to less user activity than intended throughout the trial period. Also, some informants referred to decreasing awareness of the platform, pointing out the recurrent reminder emails as a necessary means to maintain their continuous attention (Table 8).

In general, the informants perceived that they benefited from the counselling programme. However, there

were variations regarding the impacts of the individual programme components. Some were surprised by the apparently simple content of the information provided. At the same time, however, the informants considered the counselling to be useful, as it very concretely had its starting point in the everyday life of the patient. Several referred to the process of learning, and how this could lead them to adapt to a new set of habits. Others emphasized the supportive effect of being met with empathy regarding the difficulties of living with hand eczema, or they valued meeting with peers (Table 9).

Discussion

In this mixed-methods study, we investigated potential differences between those patients (63%) who used a

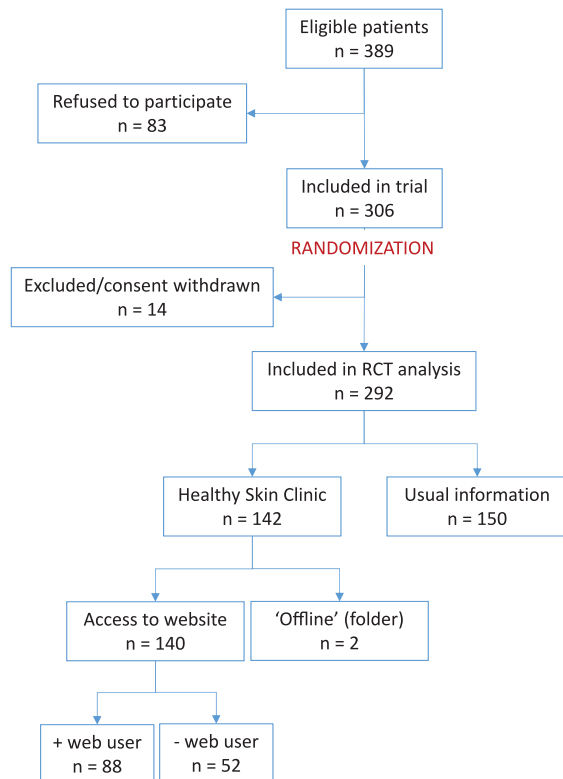


Fig. 2. Trial flow chart of the randomized controlled study (RCT).

counselling website solution and those who did not (37%). When analysing the participants' confidence and behaviour regarding hand eczema self-management (Table 4), we found that the active website users had a higher overall score of the 10 items and that they reported significantly more change in habits. Furthermore, the website users improved more than the non-website users regarding quality of life, and self-reported disease severity and itching. As we found no differences between website users and non-website users regarding sex, age, and educational level, it appears that the supplementary website as such had an effect.

Using the internet as a means of supplementing outpatient-based treatment of eczematous disease appears to be still an untrodden path. We have identified only a few other studies, all in atopic dermatitis populations, in which eHealth solutions comparable to ours have been tested in clinical settings (18–20). One of these studies (19) found no difference in clinical outcome, but an economic benefit in favour of eHealth as compared with usual face-to-face counselling. It could be valuable if more detailed analyses of website user activity related to the clinical and self-reported outcomes in this study could be reported.

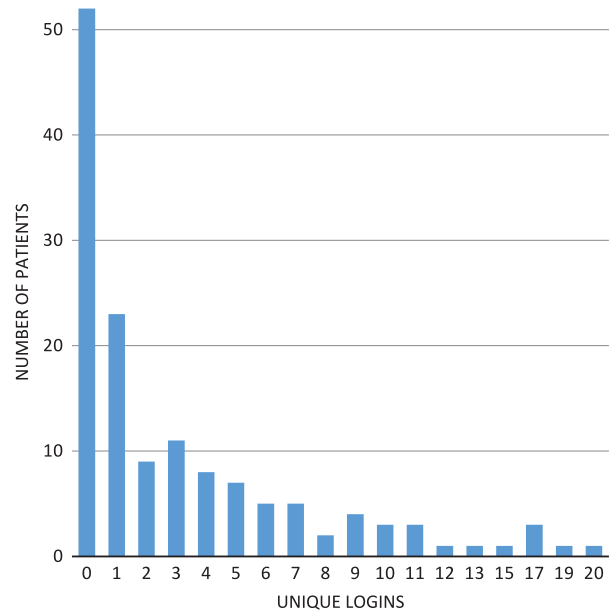


Fig. 3. Bar chart of frequencies of unique logins to the website based on data from the transaction log.

Our website comprised both cognitively and emotionally supportive features, and although, ideally, all of the participants would have used the website, several reasons may have contributed to only two-thirds actually doing so. First, the website solution was offered as an adjunct, not an alternative. Thus, some patients may have found themselves sufficiently informed through the face-to-face counselling. The email reminders did provoke user registration in the self-monitoring log, as stated by participants. However, the patients were not required to use the website in order to participate in the trial. Second, hand eczema is known to be dynamic, with a fluctuating course. In times of less or no disease activity, people may not be motivated to actively pursue information or engage in peer interaction. The website users had a borderline significantly higher disease severity, both as clinically measured at baseline and as self-reported as a VAS_{worst} assessment, than the non-website users. Utilization therefore seemed to be associated with the level of disease severity. However, the patients with the highest disease severity also had significantly more consultations. This expanded window of opportunity among these patients may have enabled timelier solving of potential technical problems in accessing the website, or simply increased awareness of the intervention.

We deliberately focused on different learning styles and individual needs when developing the website, by offering both factual information and information to be obtained through quizzes. We also attempted to tailor the

Table 2. Comparison of non-website users and website users in the intervention group (n = 140)

	Non-website users	Website users	p-value ^a
Intervention group, n (%)	52 (37.1)	88 (62.9)	–
Gender, n (%)			0.375
Women	31 (34.4)	59 (67.0)	–
Men	21 (42.0)	29 (58.0)	–
Age, mean (SD)	36.6 (13.6)	39.1 (13.7)	0.288
HECSI, median (IQR)	29.0 (16.0–71.5)	50.0 (21.0–84.0)	0.069
DLQI, median (IQR)	5.0 (2.0–7.0)	5.0 (3.0–9.0)	0.174
VAS _{now} , mean (SD)	4.6 (2.3)	4.7 (2.6)	0.996
VAS _{worst} , mean (SD)	7.9 (1.5)	8.3 (1.6)	0.071
Itch-VAS _{4weeks} , mean (SD)	5.0 (2.5)	5.4 (2.8)	0.449
DMARS-4, mean (SD)	17.4 (2.6)	17.6 (2.3)	0.730
General self-efficacy, mean (SD)	32.2 (5.4)	30.9 (5.9)	0.264
Intensified treatment, n (%)			0.052
No	37 (43.5)	48 (56.5)	–
Yes	15 (27.3)	40 (72.7)	–
No. of medical consultations, mean (SD)	2.2 (1.1)	2.9 (1.5)	0.002

DLQI, Dermatology Life Quality Index; DMARS-4, Danish Medication Adherence Report Scale; HECSI, Hand Eczema Severity Index; IQR, interquartile range; SD, standard deviation; VAS, visual analogue scale; VAS_{now}, current burden of disease; VAS_{worst}, burden of disease when it is at its worst.

^aMann–Whitney *U*-test independent groups for continuous data and Pearson chi-square test for nominal data; questionnaire data; data from non-website users (n = 37–39) and website users (n = 83–88).

Bold value; statistically significant result.

Table 3. Groupwise comparisons of improvements in Hand Eczema Severity Index (HECSI), Dermatology Life Quality Index (DLQI), VAS_{now} and itching at follow-up

	Non-website users	Website users	p-value ^a
ΔHECSI, median (IQR)	9.0 (–6.0 to 37.5)	20.0 (–1.5 to 51.0)	0.155
ΔDLQI, median (IQR)	1.0 (–4.0 to 3.0)	2.0 (0.0 to 5.0)	0.014
ΔVAS _{now} , mean (SD)	0.2 (2.9)	1.5 (2.9)	0.053
ΔItch-VAS _{4weeks} , mean (SD)	0.2 (3.2)	1.7 (3.1)	0.052

ΔDLQI, DLQI at baseline minus at follow-up; ΔHECSI, HECSI at baseline minus at follow-up; IQR, interquartile range; ΔItch-VAS_{4weeks}, itching within last 4 weeks at baseline minus at follow-up; SD, standard deviation; VAS, visual analogue scale; ΔVAS_{now}, current burden of disease at baseline minus at follow-up.

^aMann–Whitney *U*-test independent groups were used because of non-normal data distributions; questionnaire data; data from non-website users (n = 27–29) and website users (n = 77–81).

Bold value; statistically significant result.

eHealth solution by presenting an individual profile and encouraging self-monitoring. This multimodal approach proved its worth. Both the face-to-face counselling session and the information available on the website highlighted the importance of changes in behaviour towards more skin-protective habits. In the qualitative evaluation, the patients stated that they actually acquired knowledge that they did not possess beforehand, and that they could act differently because of this new insight. Conversely, some participants may have been discouraged by the complexity of the programme, causing them to refrain from using the website.

For some patients, participating in the trial became educative with regard to the concept of self-management. They became aware that they themselves could influence

their hand eczema rather than the eczema just being something given. Patients who are knowledgeable regarding the disease causality and the potential for prevention have increased competence to act. Sometimes, it is not possible to alter every habit simultaneously, and one may deliberately choose to be non-compliant at moments such as that indicated by a quotation in Table 9 (James). This emphasizes that adoption of new habits and behavioural changes is a process of transition.

Drop-out is suggested to be especially frequent in eHealth intervention trials, because of what has been referred to as ‘the law of attrition’ (21). This describes the phenomenon of participants stopping usage and/or being lost to follow-up, perhaps because of loss of interest. Overall, 63% website users appears to be a satisfactory

Table 4. Responses to a 10-item questionnaire about hand eczema self-management

How would you describe yourself according to the following statements? (0: It does not fit at all. 10: It fits perfectly)	Non-website users		Website users		p-value ^a
	Mean (SD)	n	Mean (SD)	n	
I can recognize new eruptions or worsening of my hand eczema and respond to this	7.1 (2.7)	35	7.5 (2.6)	83	0.345
I know when to begin using topical steroid at eruptions or worsening of my hand eczema	6.8 (3.0)	32	7.4 (2.7)	81	0.379
I am confident that I can handle my hand eczema in the case of eruptions or worsening	6.9 (2.0)	35	7.2 (2.4)	83	0.288
I know when to consult my GP or a dermatologist because of my hand eczema	7.2 (2.4)	35	7.3 (2.7)	83	0.560
I have changed my habits as regards my hand eczema	6.6 (3.2)	35	7.9 (2.4)	83	0.024
I use gloves to protect my skin against allergens and irritants	6.6 (3.3)	35	7.6 (3.0)	83	0.090
I can take the necessary precautions related to my hand eczema in my leisure time	8.0 (1.8)	35	7.9 (2.2)	83	0.661
I can take the necessary precautions related to my hand eczema while I am at work	7.2 (2.4)	35	7.5 (2.4)	80	0.365
I know my allergies and/or the irritants that cause my hand eczema	5.2 (3.5)	35	5.3 (3.5)	82	0.874
I can control my hand eczema if I try hard enough	5.6 (3.6)	35	5.8 (3.4)	83	0.779
Overall sum score	67.5 (14.5)	32	72.1 (15.4)	79	0.093

SD, standard deviation.

^aThe Mann–Whitney *U*-test was used because of non-normal data distribution.

Bold value; statistically significant result.

Table 5. Participants in the focus group interview

Name	Age (years)	Profession	HECSI	DLQI	VAS _{worst}	Self-efficacy	No. of visits
Charlotte	53	Kitchen work	86	9	6.5	39	0
Jane	64	Associate professor	106	–	8.5	31	7
Eve	48	Day care	128	17	9.4	27	4
Joyce	62	Healthcare assistant	59	7	9.6	37	1
Linda	47	Office work	136	19	10	38	7
Claire	40	Nurse	132	26	9.6	32	9

DLQI, Dermatology Life Quality Index; HECSI, Hand Eczema Severity Index; VAS, visual analogue scale; VAS_{worst}, burden of disease when it is at its worst.

All the names are pseudonyms.

proportion (i.e. we are satisfied with the number of users). In a trial of web-based consultations for parents of children with atopic dermatitis, only 38% of the participants in the respective group used the intervention (20). Parents of children with chronic diseases may be more motivated to comply than adult patients in general. Although this is only speculative, the different drop-out ratios in another eHealth intervention comprising both adult patients (drop-out, 58.9%) and parents of children with atopic dermatitis (drop-out, 35.6%) might support this (19). The activity pattern of the 63% website users in our study was very diverse. A group of participants paid only one visit to the website ($n = 23$), whereas the majority of the website users visited the site 2–20 times ($n = 65$). This shows that such an intervention appeals differently to different patients. Our patient cohort was highly heterogeneous and, in general, older than in other studies. Patients up to 70 years of age may be more reluctant to use eHealth solutions because of less IT confidence. In our study, the website users were actually slightly older than the non-website users, but, as mentioned above, they were also more affected by their disease.

Some specific barriers to utilization of the website were identified. First, the website was launched concurrently with the inclusion of the first participants. Thus, for some time, the pioneering patients allocated to the intervention group were the sole contributors to the patient dialogue forum. We have not found evidence suggesting that a minimum volume of users is needed for such forums. However, the consecutive approach for inclusion in the trial may have hindered optimal usage of this feature, which also affected the user satisfaction as stated by some participants. Second, the strict user authentication solution was perceived by some participants as troublesome. Although others found the login process unproblematic, in retrospect the authentication procedure should preferably have been prompted only in the event of self-monitoring and/or use of the contact formula. This could have facilitated more use of the information sites, the quizzes, and the patient dialogue forum.

Some participants missed specific feedback on their usage of the electronic self-monitoring log, whereas others were quite content that the counselling programme was intended to promote self-awareness and self-management on their own initiative. We could have

Table 6. Participants in individual interviews

Name	Age (years)	Profession	HECSI	DLQI	VAS _{worst}	Self-efficacy	No. of visits
Jocelyn	56	Office work	92	–	10.0	40	3
Elisabeth	57	Controller	136	7	10.0	30	15
Josephine	26	Biology student	56	6	8.3	36	20
Lauren	48	Dental clinical assistant	39	3	6.0	35	0
Lisa	49	Healthcare assistant	41	4	9.5	29	1
Billy	58	Production manager	43	3	9.0	38	10

DLQI, Dermatology Life Quality Index; HECSI, Hand Eczema Severity Index; VAS, visual analogue scale; VAS_{worst}, burden of disease when it is at its worst.

All the names are pseudonyms.

Table 7. Participants' comments from follow-up questionnaire

Name	Age (years)	Profession	HECSI	DLQI	VAS _{worst}	Self-efficacy	No. of visits
Ellen	27	Private day care	21	0	10.0	21	7
James	32	Chauffeur	98	2	8.0	36	1
Otto	47	Mechanic	64	–	–	–	0
Leonard	43	Cook	108	12	10.0	38	19
Brigitte	49	Office work	85	–	8.0	28	6
Selma	60	Office work	105	7	8.5	36	0
Peter	53	Technician	38	7	8.0	28	1
Adele	33	Kindergarten assistant	70	20	10.0	24	3

DLQI, Dermatology Life Quality Index; HECSI, Hand Eczema Severity Index; VAS, visual analogue scale; VAS_{worst}, burden of disease when it is at its worst.

All the names are pseudonyms.

focused more on the baseline matching of expectations to promote a higher degree of self-control among the patients, perhaps even by formulating a contract as recommended (22).

Only a few participants used the contact formula on the website, which contrasts with an average number of 3.4 e-consultations reported by van Os-Medendorp et al. (19). However, this latter trial had a follow-up period twice as long as ours. It is likely that a longer study period in our trial could have brought about more patients with relapse of disease, and thereby in need of consultation. Some patients in our study initiated threads in the patient dialogue forum and raised specific questions to peers. For example, 1 woman asked for fragrance-free toothpaste, and another needed advice on where to buy gloves without rubber accelerators. These requests could easily, and perhaps more suitably, have been directed to the professionals, but were not. This feature of the website should perhaps have been advertised more, to facilitate awareness of the possibilities.

A drawback of this study is the possibility of selection bias. Selection is present in several stages of the trial, from the number of patients who, although eligible according to the inclusion criteria, refused to participate, to the 20 individuals who uttered their opinions and whose quotations came to illustrate the qualitative evaluation. The members of this latter group were significantly older than the remaining cohort of included patients (mean

age of 47.6 years versus 39.2 years, $p = 0.005$). We have previously seen in this cohort that higher age determines higher self-reported medication adherence (23). Therefore, some of our findings may be partly explained by a healthy adherer effect. However, regarding self-reported data, it will always be the most adherent individuals who respond to questionnaires. The informants also had higher disease severity, with a median HECSI of 85.5, as compared with a median HECSI of 40.0 among the non-informants ($p < 0.001$). Nonetheless, hand eczema fluctuates by nature (and nurture), so the selected group may be a less defined entity than most patient subgroups usually are.

Some participants may have answered the questionnaire in such a way that they would be viewed favourably by others, thus creating a social desirability bias. The use of a mixed-methods approach in the study actually provided an insight into to how data, from a social constructivist perspective, are always construed in one way or another. For example, one of the focus group participants criticized the counselling programme by pointing out that she had not had any response from the intervention team when using the contact formula in the website. In a pause of the group session, she was confronted with the transaction log showing no contact activity in her user account. This made her conclude that she had perhaps felt the need to communicate with the team and thought about contact, but had never done so. It is rare to

Table 8. To use the website or not to use it

Category	Context	Data extracts
Using the website	Ellen; talking about how treatment and the right counselling had been helpful	'Just before I started, I had really severe eczema and I almost couldn't do anything. I'm almost free of the problem today ... I have only used the website to register new eruptions because I feel that I'm in control of my eczema ...'
	Brigitte; referring to personal problems in the trial period	'I haven't used the website so much because of my mother's admission to hospital. Sadly, she died, so a lot of practical issues have been taking up my time'
	Otto; talking about lack of time and perhaps also about unmet expectations	'Truly, I'm sorry that I haven't been able to spend the time needed and haven't participated in the project. The first time I visited the website, I was completely turned off, and I haven't used it since. I'm sorry ...'
The login procedure	Claire; referring to the authentication procedure (nemID-login)	'It's troublesome, quite frankly I think so, troublesome. Because then I have to get to my drawer. It has to be right here and now otherwise it becomes too awkward, right'
	Eve; satisfied with the nemID-login	'... because I'm so fed up with all these passwords which you forget. So, I think it's fine, this login-procedure'
Technical issues as regards self-monitoring	Elisabeth; referring to marking of the eczema extent	'So, you had to point it out and then, if you just miss again, it was removed again. So, sometimes I thought it took too much time to sit there and point out all my eczema on both hands, right. Because I had so much [eczema], right'
Linguistic usage of the information sites and other sites	Josephine; referring to her not having problems with medical terminology because of her profession	'Now ... I think it's truly important when making an interface for a wide group of users that you don't talk too much medical jargon. I think that you've been good in doing so, to get it to a level where I could follow without it being too much baby language either. That's not cool either ...'
	Jocelyn; talking about the need for an underlying pedagogic approach of such a website	'Well, when instructing people, or poking at them, then you need to do it pedagogically. Then sometimes the recipient may think; come on! Now we are in kindergarten! And that's not what I've seen in this website ... I think this was done very nicely'
Using the patient dialogue forum	Claire; disappointed about the lack of activity in the forum	'... It was such an annoying thing! I skipped it, I thought; nothing happens here. You don't get any response and no one uses it. Is it only 'old people' who participate in this project, who do not use the internet, I thought [laughing]. No, I became sort of – urrrh! Because this forum was exactly what could have been ...'
Using the quiz module	Elisabeth; referring to different learning styles	'Yes, well because you sort of learn through play, right. Most people like quizzes, sort of replying to questions, right. It's more exciting, maybe, than to just sit and slave over it, page by page. I'm not good at that ...'

have both quantitative and qualitative data of the same phenomenon, but this example shows the strengths of using a mixed-methods approach.

Discontinuance of eHealth solutions in clinical trials is considered to be a fact of life, and at the same time a phenomenon worth reporting. We could have analysed attrition curves and used Kaplan–Meier statistics, as previously suggested (21). Instead, we chose to use qualitative methodology, which provided a deeper insight into why some patients withdraw from interventions such as this and others remain active users.

Conclusion

To summarize, this study shows that multimodal counselling interventions contribute to patients becoming more knowledgeable and prone to behavioural changes. Nevertheless, one-third of the patients did not use the website. This shows that one size does not fit all; eHealth solutions may be useful, but they cannot stand alone. Face-to-face encounters are still valued and needed. Furthermore, it is important to match expectations between the professionals and the patients, and to tailor

Table 9. Behavioural, learning and supportive outcomes from the counselling programme

Category	Context	Data extracts
Acknowledging the potential for changing one's behaviour	James; referring to becoming more knowledgeable	'I've found out how I can avoid having hand eczema. I do not always comply with the recommendations, which of course I cannot fail to see. But now it has more to do with changing habits'
	Charlotte; about effects of even minor behavioural changes	'... I was really frustrated when I first came here. I just thought; is it all about these small simple things? I could just see how things began to work out for me ...'
Educational benefits from the website and the nurse counselling	Linda; referring to the quiz module	'Also I have used this 'Snap the Six'. I think that it has been a tremendous eye-opener to me; knowledge that I can use ...'
	Billy; about gaining knowledge applicable to everyday life	'I used the six questions, yeah, I used them a lot ... I think this was a really good way to gain knowledge, yes. Because, it's simply such everyday things that you just don't think about, yet it comprises the stuff that you can use ...'
	Eve; reflecting about the learning gained during the trial	'... You don't know anything when you come here. All the doctors say: "We can help you." No, they cannot! They can help you with a tube of cortisone and that's that, right? So, it was nice to come to the clinic and I think that it's the nurses who gave me all the good advice ...'
Peer interaction	Elisabeth; reflecting about the relativity of eczema severity and how it may be helpful to see others with more severe disease	'But I like reading about others who have the same or may have something better or worse, right ... I know it sounds harsh but then perhaps you are a bit relieved that it is not so bad after all, right ...'
Self-monitoring and reflection	Charlotte; wondering about the benefits of using a log	'But even though I haven't used it myself, I can see that it may be smart because surely, you'll forget; when was the last time, right? Then you can use it sort of like a diary or just once in a while so you can look back, right ...'
	Linda; referring to using her personal log	'I have used it to reflect upon a certain period with a very severe eruption; how have I acted differently in this period besides what I usually do, or have I eaten too many tomatoes or whatever it may be, right ...'
Support for self-management	Leonard; about going through a crisis	'Even though I have had a really tough period, job-related, I'm grateful for the treatment and the responsiveness I have received [at the clinic]. This has been very dear to me ...'

counselling interventions according to differences in learning styles.

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References

- 1 Cvetkovski R S, Zachariae R, Jensen H et al. Quality of life and depression in a population of occupational hand eczema patients. *Contact Dermatitis* 2006; **54**: 106–111.
- 2 Mollerup A, Johansen J D, Thing L F. Knowledge, attitudes and behaviour in everyday life with chronic hand eczema: a qualitative study. *Br J Dermatol* 2013; **169**: 1056–1065.
- 3 Flyvholm M A, Mygind K, Sell L et al. A randomised controlled intervention study on prevention of work related skin problems among gut cleaners in swine slaughterhouses. *Occup Environ Med* 2005; **62**: 642–649.
- 4 Sell L, Flyvholm M A, Lindhard G, Mygind K. Implementation of an occupational skin disease prevention programme in Danish cheese dairies. *Contact Dermatitis* 2005; **53**: 155–161.

- 5 Bregnhøj A, Menné T, Johansen J D, Søsted H. Prevention of hand eczema among Danish hairdressing apprentices: an intervention study. *Occup Environ Med* 2012; **69**: 310–316.
- 6 Ibler K S, Jemec G B, Diepgen T L 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.
- 7 van der Meer E W, Boot C R, Twisk J W et al. Hands4U: the effectiveness of a multifaceted implementation strategy on behaviour related to the prevention of hand eczema – a randomised controlled trial among healthcare workers. *Occup Environ Med* 2014; **71**: 492–499.
- 8 van Gils R F, Boot C R, Knol D L et al. The effectiveness of integrated care for patients with hand eczema: results of a randomized, controlled trial. *Contact Dermatitis* 2012; **66**: 197–204.
- 9 Wulfhorst B, Bock M, Gediga G et al. Sustainability of an interdisciplinary secondary prevention program for hairdressers. *Int Arch Occup Environ Health* 2010; **83**: 165–171.
- 10 Skudlik C, Wulfhorst B, Gediga G et al. Tertiary individual prevention of occupational skin diseases: a decade's experience with recalcitrant occupational dermatitis. *Int Arch Occup Environ Health* 2008; **81**: 1059–1064.
- 11 Skudlik C, Weisshaar E, Scheidt R et al. First results from the multicentre study rehabilitation of occupational skin diseases – optimization and quality assurance of inpatient management (ROQ). *Contact Dermatitis* 2012; **66**: 140–147.
- 12 Møllerup A, Veien N K, Johansen J D. Chronic hand eczema – self-management and prognosis: a study protocol for a randomised clinical trial. *BMC Dermatol* 2012; **12**: 6.
- 13 Møllerup A, Veien N K, Johansen J D. Effectiveness of the healthy skin clinic – a randomized clinical trial of nurse-led patient counselling in hand eczema. *Contact Dermatitis* 2014; **71**: 202–214.
- 14 Held E, Skoet R, Johansen J D, 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.
- 15 Finlay A Y, Khan G K. Dermatology Life Quality Index (DLQI) – a simple practical measure for routine clinical use. *Clin Exp Dermatol* 1994; **19**: 210–216.
- 16 Luszczynska A, Scholz U, Schwarzer R. The general self-efficacy scale: multicultural validation studies. *J Psychol* 2005; **139**: 439–457.
- 17 Agner T, Held E. Skin protection programmes. *Contact Dermatitis* 2002; **47**: 253–256.
- 18 Santer M, Müller I, Yardley L et al. Supporting self-care for families of children with eczema with a Web-based intervention plus health care professional support: pilot randomized controlled trial. *J Med Internet Res* 2014; **16**: e70.
- 19 van Os-Medendorp H, Koffijberg H, Eland-de Kok P C et al. E-health in caring for patients with atopic dermatitis: a randomized controlled cost-effectiveness study of internet-guided monitoring and online self-management training. *Br J Dermatol* 2012; **166**: 1060–1068.
- 20 Bergmo T S, Wangberg S C, Schopf T R, Solvoll T. Web-based consultations for parents of children with atopic dermatitis: results of a randomized controlled trial. *Acta Paediatr* 2009; **98**: 316–320.
- 21 Eysenbach G. The law of attrition. *J Med Internet Res* 2005; **7**: e11.
- 22 Tones K, Green J. *Health Promotion. Planning and Strategies*, 2nd edition: London, SAGE Publications Ltd, 2004.
- 23 Møllerup A, Veien N K, Johansen J D. An analysis of gender differences in patients with hand eczema – everyday exposures, severity, and consequences. *Contact Dermatitis* 2014; **71**: 21–30.