General discussion and conclusion
DISCUSSION

In this final chapter two important topics will be further elucidated; I) Pathogenesis of hand eczema and II) A broader vision on hand eczema care. The first part will share some interesting thoughts in the light of recently published papers regarding the discovery of the pathogenesis of hand eczema, of which Chapter 2 is one of them. The second part will describe a broader vision of care for patients with hand eczema, shifting from cure to care as a common thread. Whereby ‘cure’ stands for the classical medical point of view, centralizing the disease and treatment, while ‘care’ incorporates a broader view with a more holistic approach when counseling patients with hand eczema. Although this is not primarily included in the conducted research presented, there is a major interface with several aspects of the current thesis such as new treatment options, lifestyle factors, and health literacy. Finally, the main conclusions of this thesis are outlined.

Part I – Pathogenesis of hand eczema

Gene and protein expression

The pathogenesis of hand eczema is far from fully elucidated yet, although, some aspects of the pathogenesis of hand eczema has been recently added to the existing knowledge regarding this topic. At this moment, a few small studies provide insights into the gene and protein expression profiles of hand eczema, of which Chapter 2 is one of them. A study by Molin et al. compared the protein expression profile in skin biopsies from six patients with chronic hand eczema with different (combined) etiological subtypes and six healthy controls through liquid chromatography with tandem mass spectrometry analyses.1 Several barrier proteins as filaggrin, filaggrin-2, and hornerin were downregulated in lesional skin. Antimicrobial peptides as S100A7/A8/A9 were upregulated in affected skin compared to healthy control skin. It was concluded that a decreased skin barrier function could play an essential role in the pathogenesis of hand eczema. A second study investigated the gene and protein expression profile in 15 patients with chronic hand eczema (not further specified) before and after treatment with alitretinoin (9-cis-retinoic acid).2 Before treatment, a significantly increased expression of Ki-67-positive cells and a reduced expression of several skin barrier genes and proteins were found (among others: loricrin, filaggrin, and keratin (K) 10), which all normalized after treatment. Jungersted et al. compared stratum corneum samples of adjacent nonlesional skin of allergic/irritant vs hyperkeratotic hand eczema and showed no significant differences in lipid profile between the subtypes of hand eczema.3 Another recently published study investigated the transcriptome of vesicular hand eczema through ribonucleic acid (RNA)-sequencing in ten patients.4 An upregulation of genes involved in keratinocyte host defense, inflammation, epidermal proliferation and differentiation, and immune signaling was seen in lesional skin compared to healthy control skin. The expression of a few genes was downregulated, most notably for loricrin and interleukin
(IL)-37. Altogether, the study concluded a large overlap between the transcriptome profiles of vesicular hand eczema and the earlier reported atopic dermatitis lesional transcriptome profiles, even though none of the subjects had current atopic dermatitis and only two reported a history of atopic dermatitis. A very recent published study collected tape strip samples, instead of full thickness biopsies, from 30 patients with hand eczema (12 with concurrent atopic dermatitis) and 16 healthy controls. Whole transcriptome sequencing was applied. Most differences were found between lesional and healthy skin, whereas the nonlesional and healthy skin samples had similar overall gene expression profiles. Striking was that the most prominent difference between hand eczema with concurrent atopic dermatitis and hand eczema without atopic dermatitis was not seen in lesional skin but in nonlesional skin sites. Nonlesional skin of patients with hand eczema with concurrent atopic dermatitis showed an increase in several inflammatory markers compared to nonlesional skin from patients with hand eczema without atopic dermatitis. When looking into the gene expression differences between etiological subtypes, the greatest difference was found between atopic hand eczema and irritant contact dermatitis. The main advantages of tape stripping over full thickness biopsies is the non-invasive aspect of tape stripping, which enables to include larger numbers of patients with hand eczema. On the other hand, it might not be suitable for all clinical subtypes of hand eczema. For example, in subtypes with tick hyperkeratotic plaques tape stripping might not reach beyond the hyperkeratosis. In chapter 2 we investigated the gene and protein expression profile in seven patients with hyperkeratotic hand eczema. We found an upregulation of loricrin and several keratins, among others K5, K6, K16 and K17, in lesional skin compared with healthy control skin. In addition, an increased expression of Ki-67-positive cells was found in lesional skin biopsies. In contrast with the previous studies, no prominent downregulation of important skin barrier proteins as filaggrin were found. This shows less overlap with the gene/protein expression profile of atopic dermatitis, and clues were suggested into the pathogenesis of psoriasis. A second study investigated the expression of β-defensin 2 and IL-36 in 66 biopsies of palmar psoriasis, chronic hand eczema, and hyperkeratotic hand eczema. A similar expression of β-defensin 2 and IL-36 was seen in palmar psoriasis and hyperkeratotic hand eczema, while a decreased expression was seen in chronic hand eczema. At this moment, there are clues that the gene and protein expression profile of hand eczema includes several different pathophysiologic processes, possibly partly overlapping with atopic dermatitis and psoriasis.

**Genetic aspects**

When looking into the genetic aspects of hand eczema, the focus has been on loss-of-function filaggrin gene \( (FLG) \) mutations. Evidence shows that \( FLG \) mutations are associated with hand eczema in individuals with atopic dermatitis. However, the role
of FLG mutations in hand eczema without concomitant atopic dermatitis cannot be confirmed.\textsuperscript{7–10} Likewise, we also did not detect any mutations in epidermal barrier genes such as filaggrin (FLG) and Filaggrin-2 (FLG2) in seven patients with hyperkeratotic hand eczema (chapter 2). To investigate other genetic aspects beyond FLG mutations in hyperkeratotic hand eczema, all patients were also screened for variants in genes related to palmar plantar keratoderma (PPK) and no pathogenic or likely pathogenic variants that could be associated with hyperkeratotic hand eczema were detected. Recently, two small genome wide association studies (GWAS) in patients with hand eczema have been performed.\textsuperscript{11,12} No statistically significant single nucleotide polymorphisms (SNPS), including FLG, were found in the two explorative GWAS. The absence of significant findings in both studies could be highly likely attributed to the low sample size (<200 cases) and, specifically for the second study, the absence of healthy controls.

**Microbiome**

The skin microbiome has been the subject of increased research, and has also been recently studied for the first time in subjects with hand eczema. An explorative prospective study characterized the microbiome in 50 patients with hand eczema (all etiological and clinical subtypes) and 50 healthy controls during five visits over a period of three weeks.\textsuperscript{13} It was found that the bacterial diversity on the skin of the hands of patients with hand eczema was reduced compared with controls, with an abundance of Staphylococcus aureus. No differences in diversity or bacterial community structures were seen between the different subtypes of hand eczema. More severe hand eczema was characterized by reduced bacterial diversity and different bacterial community compositions.

**General thoughts pathogenesis hand eczema**

There are several important aspects which should be taken into consideration when formulating hypothesis about the pathogenesis of hand eczema. Firstly, the decreased skin barrier function can be considered both as of primary and as of secondary origin in the pathogenesis of hand eczema. For example, a down regulation of skin barrier proteins can promote penetration of irritants and/or allergens which in turn might lead to inflammation and hand eczema. Inversely, a dysregulated immune system can cause inflammation which might lead to a downregulation of skin barrier proteins. Therefore, it may be challenging to specify which portions of the found altered gene and protein expression profiles result from hand eczema, rather than are the cause of hand eczema. In some of the previously mentioned studies, nonlesional skin was also investigated. Fewer abnormalities in the RNA expression profile of nonlesional skin were seen compared with healthy control skin than for lesional skin.\textsuperscript{4} In the tape stripping study, differences were seen for nonlesional skin between hand eczema with concurrent atopic dermatitis...
and hand eczema without atopic dermatitis. This cautious supports the hypothesis of the altered skin barrier resulting from hand eczema in cases without concomitant atopic dermatitis. Secondary, there is evidence that the etiological subtypes (irritant contact dermatitis, allergic contact dermatitis, and atopic hand eczema) are connected as they can amplify each other. Irritant contact dermatitis is thought to predispose to the induction of skin sensitization. The impaired skin barrier in irritant contact dermatitis might facilitate easier penetration of possible contact allergens, resulting in a higher chance of developing allergic contact dermatitis. This was also stated as a possible explanation of the higher proportion of irritant contact dermatitis patients with at least one positive reaction to the European baseline series (45%) compared to the general population in Europe (27%) reported in chapter 4. In addition, subjects with atopic dermatitis also suffer from an impaired skin barrier, making them more prone to irritant contact dermatitis. In chapter 4 higher percentages for a history or current diagnosis of atopic dermatitis in the occupational irritant contact dermatitis group compared to the overall group were reported. The association between atopic dermatitis and allergic contact dermatitis is subject of debate. On one hand, the impaired skin barrier function might facilitate the development of allergic contact dermatitis. On the other hand, inflammation in atopic dermatitis is T helper (Th)2 skewed, while allergic contact dermatitis is predominantly Th1 driven, so individuals with atopic hand eczema might be less likely to have allergic contact dermatitis due to suppressed Th1-mediated cellular immunity. The balance of contributing and aggravating factors of hand eczema can vary per case, making it complex to unravel the general pathogenesis of hand eczema. Until now, an impaired skin barrier and a dysregulated immune system seem to be the two most important pillars in the pathogenesis of hand eczema.

**Future research pathogenesis**

Further research on the pathogenesis of hand eczema should focus on genetics and transcriptome analysis. Large, well designed GWAS with strong case definitions might provide insight into the underlying pathways of hand eczema. Especially the epidermal differentiation complex on 1q21, would be of highly interest, as this might provide more information on the primary or secondary origin of decreased skin barrier function. A cooperation with large prospective population-based cohort study's with open protocol might support this research aim. For transcriptome analysis, it would be of added value to investigate different etiological and clinical subtypes. Specifically non-atopic hand eczema and hand eczema without clear known etiology. Tape stripping will be suitable to achieve large sample sizes. More insight into the pathogenesis of hand eczema might lead to the discovery of new targets for the treatment of hand eczema.
Part II - From cure to care: A broader vision on care for patients with hand eczema

Cure - Future treatment options

Despite that chronic hand eczema is a very common skin condition which strongly impacts the quality of life, treatment options for severe chronic hand eczema not responding to topical cortical steroids are limited. Except for alitretinoin, no other systemic treatments are currently licensed for the treatment of chronic hand eczema.19 This thesis includes some first promising results of the (off-label) use of dupilumab in three cases with non-atopic hyperkeratotic hand eczema, and the use of baricitinib in two cases of atopic and non-atopic hand eczema (chapter 9 and chapter 10). Dupilumab, a monoclonal antibody inhibiting IL-4 and IL-13 signaling, and baricitinib, an oral Janus Kinase (JAK)1/2 inhibitor, are currently approved for the treatment of moderate-to-severe atopic dermatitis. Due to similarities in clinical signs and overlap in pathogenesis with atopic dermatitis, it was hypothesized that these new therapies could have potential in the treatment of chronic hand eczema as well. In addition, considering that JAK inhibitors target several cytokine pathways instead of one single pathway, it is hypothesized that this could be an effective therapy for several subtypes of chronic hand eczema. Our results were confirmed by daily practice studies and clinical trials reporting efficacy of dupilumab and JAK inhibitors in chronic hand eczema.20–23 Daily practice data of the effect of dupilumab on moderate-to-severe hand eczema in patients with atopic dermatitis showed long-term clinical effectiveness and significant improvement of hand eczema specific health related quality of life.24 Furthermore, upadacitinib, an oral JAK1 inhibitor, showed also a good clinical effect on hand eczema in patients with moderate-to-severe atopic dermatitis.20 At the moment, delgocitinib, a topical pan-JAK inhibitor, is being investigated in phase III clinical trials for mild-to-severe chronic hand eczema. Phase II clinical trials already showed promising efficacy in patients with chronic hand eczema.21,22 In addition, gusacitinib, an oral dual JAK/spleen tyrosine kinase (SYK) inhibitor, is also being investigated as treatment for chronic hand eczema. A phase Ib clinical trial reported a significant and rapid improvement of severity and pain in patients with hand eczema.23 Results from phase III clinical trials for JAK inhibitors are expected soon and are necessary to investigate the efficacy and safety profile on a larger scale. Furthermore, dupilumab is currently investigated in two proof-of-concept phase II placebo-controlled trials in patients with moderate-to-severe chronic hand eczema.25,26 Therefore, it is not unlikely that patients with moderate-to-severe chronic hand eczema may also benefit from treatment with biologics or small molecules in the future.
Care - Health care for hand eczema in a broader context

Besides investigating new treatment options for hand eczema, the multifactorial treatment approach should not be overlooked. Investigating new treatment options is time consuming and is accompanied by high costs. Whereas, for a significant proportion of the patients with hand eczema, treatment strategies will still consist of education, preventive strategies, and the use of emollients and topical corticosteroids. Therefore, research on the quality and content of provided health care in a broader context should be addressed. Physicians often approach health from a classical medical point of view, centralizing the disease and treatment, while promoting health includes a much broader concept of biological, psychological, and social well-being. Hand eczema is a common skin disease and as concluded from the results of chapter 3, the majority (63.9%) of the subjects reporting having hand eczema in the past year fulfilled the criteria for chronic hand eczema. Having a chronic disease comes with multiple consequences in terms of functional disabilities, reduced quality of life, adaptations in daily life, applying preventive strategies, treatment adherence, and self-management; all are also important and relevant for hand eczema. Patients with hand eczema often encounter multiple health related problems in different domains. Besides impact on daily and social activities, hand eczema can also affect work related aspects. Persistent disease can cause sick leave, job change and even unemployment. Furthermore, occupational exposure to irritants, and/or contact allergens can contribute to the occurrence, course and severity of hand eczema. Several of these health-related problems were also mentioned by patients with chronic hand eczema in the focus groups conducted as part of chapter 11. The patients pointed out the significant impact of having chronic hand eczema on their daily life and social activities, with even a few patients indicating that they had considered ending their life because of the burden of having chronic hand eczema. The patients also underlined the importance of including advice during consultations on organizing their lives to minimize the impact of chronic hand eczema on daily activities. While patients felt that physicians were more focused on the treatment of chronic hand eczema than on its impact. In addition, almost all patients emphasized the value of psychosocial care, however, they felt a lack of attention for this specific aspect during consultations. Lastly, patients considered it important for those providing care to look at the individual patient, because they believed every patient and every case of chronic hand eczema is different. Altogether, this emphasizes the need to incorporate multiple domains in the care provision for patients with hand eczema.

The international Classification of Functioning, Disability and Health (ICF)

The International Classification of Functioning, Disability and Health (ICF) classifies health from a patient-centered point of view, with the health problem (disease or disorder) as starting point (figure 1). It encompasses a holistic view of biopsychosocial
factors in relation to physical and personal and environmental factors. The ICF includes multi-dimensional concepts related to body functions and structures, activities, participation, and contextual (environmental and personal) factors. The ICF allows to evaluate daily functioning and participation problems of patients related to their health conditions. Therefore, the ICF can be used to incorporate multiple domains in the care for patients with hand eczema. For example, patients with hand eczema can experience symptoms as itch, pain, feelings of anxiety, depression, and dysfunction of the hands (disabilities in body function), which can negatively influence work related aspects as sick-leave or job change, and interpersonal interactions, relationships and social activities (activities and participation). In addition, personal contextual factors as health related behavior (lifestyle factors) or health literacy can affect these interactions. Furthermore, the work environment (environmental contextual factors) influences activities and job participation. Important factors are the opportunity of performing different job tasks or adaptations to the workplace. When these adjustments are not possible or not facilitated by the employer, this can negatively influence activities and job participation. In addition, also other environmental factors as stigmatization might have a large impact on participation in social activities. From daily practice, we know that the experienced burden of having hand eczema does not necessarily correlate with the severity of the disease. This suggests that other factors, such as personality or environmental factors, might positively or negatively contribute to this experienced burden. When approaching a patient with hand eczema according to the ICF, it is not

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**Figure 1.** International Classification of Functioning, Disability and Health (ICF). Source: World Health Organization Geneva 2002, Towards a Common Language for Functioning, Disability and Health: ICF.$^{31}$
necessary to extensively incorporate all domains within the first consult. However, it is recommended to briefly screen the most important domains during the first consultations to see which need greater attention. It is highly recommended to always ask about job participation and illness perception, as these two aspects are often important for patients with hand eczema. In addition, it is especially helpful to use the ICF in cases with discrepancies between disease severity and participation or in case of lack of efficacy of therapy. Factors interfering with these mechanisms can be explored according to the ICF to gain insight into the contributing factors on an individual level. The advantage of approaching hand eczema according to the ICF is that it can provide a detailed overview of all aspects influencing health and quality of life in patients with hand eczema and it forces to include a broader vision beyond the medical aspect. Therefore, it enables to tailor the care process more to individual needs.

**Personal factors - Lifestyle**

Within the ICF, lifestyle factors are part of the personal contextual factors. There is evidence that several skin diseases are associated with a less favorable lifestyle. In this thesis, chapter 5 systematically reviewed the available evidence regarding multiple lifestyle factors and hand eczema. In the meta-analysis, smoking was positively associated with the prevalence of hand eczema. From limited evidence there also seemed to be a positive association between stress and obesity and the prevalence of HE, and a possible role for stress as aggravating factor. Chapter 6 and chapter 7 described the association between lifestyle factors and hand eczema, chronic hand eczema, and severity of hand eczema in a large sample of the Dutch general population. Similar results were found with positive associations between smoking, stress, and obesity and hand eczema. However, as it is (almost) impossible to study lifestyle factors in other designs than observational studies (mostly cross-sectional), results should be interpreted with care, as no conclusions on the direction of found associations can be drawn. The exact mechanism behind these associations remains unknown. It might be hypothesized that lifestyle factors such as smoking and stress stimulate Th2 cell deviation, and therefore, at least in theory, increase the occurrence of hand eczema. Previous studies also found that obesity is associated with a chronic low-grade inflammatory state, which might also influence hand eczema. Although, the other way around is also defensible: hand eczema causes an impaired quality of life, leading to poor health behavior in subjects affected. Although, regardless of the direction of the association, the clinical importance of lifestyle interventions when counseling patients with hand eczema is still relevant and these findings can support clinicians treating patients with hand eczema to improve overall health. It would be recommended to address lifestyle factors, especially smoking behavior, during consultations and refer to relevant health care providers if
necessary. Furthermore, specific attention needs to be reserved for (chronic) stress as part of psychosocial care during the entire care process.

**Personal factors - Health literacy**

Another important personal factor is health literacy. Health literacy is often defined as ‘the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.’

Chapter 12 mapped the problem of limited health literacy for the first time in subjects with hand eczema in a large Dutch population-based study including approximately 135,000 adult participants. This unique large cohort allowed investigating subjects with self-reported hand eczema. It was found that almost a quarter had limited functional health literacy. When looking at the single questions regarding functional health literacy, 5.5% of the subjects with hand eczema reported that they needed at least sometimes help with reading hospital materials. In addition, a little over 10% reported at least sometimes trouble with understanding their medical condition due to difficulties with written information, and nearly 15% were no more than somewhat confident about filling out medical forms. Almost half of the subjects never or occasionally talked about their condition, and nearly 40% never or occasionally collected information about their condition (in general). Health literacy is particularly relevant in the care for hand eczema as it often incorporates a multifactorial treatment approach with preventive measurements, avoidance of contributing contact allergens, and schedules for topical therapy, which can be perceived as complex. In addition, written information is often standard part of the provided educational material. Optimizing the care for hand eczema starts with effective information provision on an individual patient level regarding the diagnoses, to increase disease knowledge. Secondly, information provision regarding preventive strategies and the use of emollients is crucial. Lastly, a specific focus is reserved for treatment adherence and self-management, which are essential for chronic recurrent skin diseases in which environmental and personal factors contribute, which is definitely the case for chronic hand eczema. Moreover, treatment adherence to topical therapy is even lower compared with oral treatment. For all these aspects adequate health literacy is essential. Therefore the lack of attention in published articles is striking. During the focus groups some of these encountered difficulties were also discussed (chapter 11). The etiology of hand eczema is often multifactorial, and sometimes unknown at detailed level. The diagnosis can therefore be experienced as complex by patients (chapter 11). In a Danish qualitative study, it was also highlighted that patients wanted an active role in their course of illness. However, experienced barriers, among others, were the lack of knowledge about the causes of eczema and how best to manage it. In addition, they found it challenging to apply preventive strategies in everyday life.
Therefore, health literacy needs more awareness in further research to improve care for patients with hand eczema.

**Identifying patients with limited health literacy**

The first step of improving health care for patients with limited health literacy is to become aware of the extent of the problem and to identify the individual patients with limited health literacy. A randomized trial reported that physicians who were informed of their patients’ limited literacy were more likely to use recommended communication strategies for patients with limited literacy. In chapter 12 we investigated if patient characteristics as age, sex and/or educational level were associated with limited functional health literacy among subjects with hand eczema from the Dutch general population. It was found that educational level was associated with limited functional health literacy. In general, subjects with a higher educational level were less likely to have limited functional health literacy. This might be the first clue in which patient profiles needs additional attention. It is important to gain more insight into which patients are more prone to have limited health literacy to better meet the needs of these patients. Further research is encouraged to include a broader range of patient characteristics and their association with limited health literacy.

**Interventions for improving (organizational) health literacy**

After identifying the specific patient that needs extra attention, there are a variety of strategies to improve organizational health literacy through interventions. These interventions can address spoken communication, written communication, self-management/empowerment, and the supportive system. For individual health care providers adjustment in the spoken communication might be one of the first steps to implement in clinical practice, as it involved the least time and effort of all interventions. For spoken communication a ‘clear communication’ strategy can be applied. Clear communication includes common words, limiting content to a maximum of three to five key points, repeating key points, and drawing pictures to support the provided oral information when speaking to patients. Another strategy is the teach-back method. The teach back method is a way to confirm that provided information is explained to the patient on a level they understand and can be applied to ask the patient to describe the instructions in their own words. Keep in mind that the teach back method should not be used as a method to test a patients knowledge. Other interventions can include the optimization of the readability of education materials for patients with hand eczema. Previously, 706 dermatology-related internet-based patient education materials were assessed for their readability. It was reported that the fast majority was written above the National Institutes of Health–recommended reading level. A study identifying the readability of pediatric educational material for dermatology also
investigated which changes were effective to lower the reading level of the educational material. Striking was that the reading level of the atopic dermatitis patient education materials was assessed as the highest among all 39 included education materials (12th grade reading level). Edits that decreased the number of syllables per words, decreased the percent of words that are ≥3 syllables, and decreased the number of words with ≥3 syllables were the most effective.49 In addition, the use of graphics and clearly defined divisions and headings could improve the readability of educational material.44 The previous studies assessed readability based on readability scales and formulas, but ideally patients should be part of this assessment as well, as, after all, including their perception and improvements of readability and understanding, is what it is all about.

The role of a specialized nurse
A specialized nurse can act as a key player in the care for chronic hand eczema. The added value of information provision by a nurse was also indicated by the patients of the focus groups. They mentioned the extra time and attention together with the open communication as advantages. Some of the patients could also conceive a greater role for a specialized nurse in psychosocial aspects of having chronic hand eczema (chapter 11). Previous literature investigating the role of the nurse in the care for hand eczema and atopic dermatitis reported positive results. A randomized study in 306 patients with hand eczema evaluated the effectiveness of a nurse-led counseling program and reported greater reductions in clinical severity and more beneficial behavior changes at follow-up in the intervention group (nurse-led counseling program) compared with the usual-care group.50 Furthermore, a randomized controlled trial in 160 children with atopic dermatitis reported that the parents were more satisfied regarding the received care by a nurse and it was cost-saving and cost-effective to provide full consultations by a nurse.51,52 In the same study it was reported that the nurse combined medical problems with the consequences of these problems, which could have led to a higher satisfaction rate. Nurses are often educated with a broader vision on health. They are trained to care from a nursing role with a patient-centered approach to address the needs of the patient, enables them to incorporate multiple domains according to the ICF in the care provision for patient with chronic hand eczema. They can explore the needs for lifestyle interventions and screen for limited health literacy among patients. In addition, they can address job participation and illness perception, all to adjust the care to the specific needs of the individual patient.

CONCLUSION
In summary, an impaired skin barrier and a dysregulated immune system seem to be the two most important pillars in the pathogenesis of hand eczema. Future research on
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the pathogenesis of hand eczema should focus on genetics and transcriptome analysis, including different etiological and clinical subtypes. At this moment some new treatment options for hand eczema in terms of biologics and (topical) JAK inhibitors are under investigation and will hopefully become available in the future for patients with hand eczema. Besides new treatment options, the multifactorial treatment approach for hand eczema remains essential. Approaching hand eczema according to the ICF model can facilitate a shifting from a cure based approach to a care based approach. Furthermore, it would be recommended to address lifestyle factors when counseling patients with hand eczema and refer to relevant health care providers if necessary. In addition, specific attention needs to be reserved for (chronic) stress as part of psychosocial care. An underexposed factor in hand eczema care is health literacy. However, a substantial proportion of subjects with hand eczema are at risk to encounter problems due to limited functional, communicative or critical health literacy. Specialized nurses can act as key players in the care for chronic hand eczema. They can explore the needs for lifestyle interventions and screen for limited health literacy among patients to adjust the care to their specific needs. Further research is encouraged to include a wider range of patient characteristics and their association with limited health literacy and to evaluate the effect of interventions to improve health literacy. Finally, it is crucial to involve patients in future research regarding all these topics.
REFERENCES


