

Health-related quality of life in health care workers with work-related skin diseases

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Background: Occupational skin diseases (OSDs) are common among health care workers (HCWs). Little is known about how OSD impacts on health-related quality of life (HRQoL) in HCWs with suspected OSD and associated factors.

Objectives: To describe HRQoL in 278 HCWs with suspected OSD, compare data with the general and populations with skin diseases and analyse HRQoL's associations with clinical and demographic variables.

Methods: HCWs with suspected OSD completed a generic (SF-36) and specific (Skindex-29) instrument.

Results: Seven of 8 SF-36 dimensions were significantly lower in HCWs than the general population. Compared with norms for patients with skin disease and cleaning and kitchen employees (CKEs) with suspected OSD, physical functioning (PF) and general health perception were less impaired in HCWs. Skindex-29 scores were similar to CKEs' while they appeared better than patients' norms. Multivariate analysis found severity unrelated to SF-36, apart from pain but associated with all Skindex-29 scales.

Conclusions: Although HCWs with suspected OSD display considerable HRQoL impairments, (general) PF and general health perception appear less affected than expected. Severity appears to affect specific and to a lesser extent general HRQoL. Clinical and demographic variables contributed moderately to the prediction of specific and little to the prediction of general HRQoL.

Key words: health care workers; occupational dermatoses; quality of life; skin disease. © John Wiley & Sons A/S, 2009.

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Although the extent of somatic impairment in patients with occupational skin disease (OSD) is well documented (1), little is known about how health-related quality of life (HRQoL) is affected in health care workers (HCWs) with work-related skin diseases. Skin disease in general has, however, been associated with HRQoL impairment (2–10). Since it is known that HRQoL is only poorly to moderately related to physicians' ratings of disease severity (11, 12), HRQoL questionnaires significantly add to a comprehensive clinical assessment (13, 14) because they take the subjective view of the afflicted individual into account. A recent comprehensive review recommends the generic SF-36 and the disease-specific Skindex-29 as the HRQoL measures of choice in dermatology (14) based

on their psychometric properties, appropriateness, and their ability to detect an impact on mental health. Comparing scores on these measures between HCWs with OSD and healthy individuals or populations with skin disease can inform us about the scope of HRQoL impairment in these individuals and whether particular areas are more or less affected.

The aim of the present study was (i) to assess HRQoL as measured by a generic and a dermatology specific instrument in HCWs with suspected OSD by comparing it with standardization data for the general population and populations with skin diseases and (ii) to assess the independent associations of sex, age, duration of skin disease, atopic skin diathesis, severity of skin condition, and number of

type IV sensitizations with the subscales of these two instruments.

Participants, Methods, and Procedure

When a suspected OSD in a HCW is reported to the Accident Prevention and Insurance Association in the Health and Welfare Services, the HCW is immediately invited to (voluntarily) attend a 2-day instruction course on the secondary prevention of OSD (15, 16). During courses taking place between April 2005 and June 2006, 278 HCWs with suspected OSD also completed two measures of HRQoL, the SF-36 (17) and the Skindex-29 (11). We used the respective validated German versions of the SF-36 (18) and Skindex-29 (13). The recall period of both measures is 7 days.

The German version of the Skindex-29 is a self-administered questionnaire measuring HRQoL in patients with skin diseases in three domains: burden of *symptoms* (7 items), social and physical *functioning* (PF) (12 items), and *emotional* responses (10 items). Items are answered on a 5-point Likert scale (Never, Rarely, Sometimes, Often, and All the Time). Scale scores are computed by adding all respective scale item scores and division by the number of items forming that scale. The instrument has been shown to be valid and reliable (13). Higher scores indicate a higher impact of the skin condition on HRQoL.

Of the 278 HCWs with suspected OSD, 239 completed the Skindex-29. Two had more than 25% missing values and were excluded from the analyses. Missing values on the 29 items among the remaining 237 individuals were completely at random (MCAR-Test according to Little: $\chi^2 = 233.3$, $df = 233$, $P = 0.48$), ranged from 0 to 1.7% and were subsequently imputed by the mean of that item.

The German version of the SF-36 contains 36 items. Generic in nature, it measures eight dimensions of HRQoL: Physical functioning (PF) (10 items), role-physical functioning (RPF) (4 items), role-emotional functioning (REF) (3 items), social functioning (2 items), pain (2 items), vitality (4 items), mental health (5 items), and general health perception (5 items). In addition, perceived change in health is assessed by one item. Computing total subscores of the eight dimensions by adding the respective item answers allows a quantitative assessment of a patient's subjective health.

Out of 278, 236 HCWs with suspected OSD completed the SF-36. It is recommended to replace the missing values by the scale's mean if at least 50% of the scale's items are answered (18). Further, recoding and recalibration are necessary for some items. Individual scale scores are computed

and transformed into standardized scores with a possible range of 0–100 to ease comparisons across scales and samples. The complex algorithm for computing standardized scale and total scores has been documented in detail (18). The number of individuals with complete standardized scores on any of the eight dimensions was between 232 and 236. Lower scores indicate greater HRQoL impairment.

Statistical analyses

Statistical analyses were carried out using SPSS 16. Absolute and relative frequencies for nominal and means and standard deviations for continuous variables were used to describe the data. We compared the scores on the SF-36 dimensions between HCWs with suspected OSD and norms for the German general population, people with skin diseases (18) and cleaning and kitchen employees (CKEs) with suspected OSD (19) by multivariate analysis of variance (MANOVA) and follow-up analysis of variance (ANOVA). Analogously, we compared Skindex-29 scale scores with CKEs with suspected OSD (19). Univariate associations of SF-36 and Skindex-29 with sex, age, duration of skin disease, atopic skin diathesis, severity of skin condition, and number of type IV sensitizations were analysed by Pearson correlation coefficients. In multivariate regression analyses, subscales of Skindex-29 and SF-36 were regressed on the aforementioned variables to assess their associations while controlling for all other variables in the models.

Results

Sample characteristics

The vast majority of the sample ($n = 278$) of HCWs with OSD was female (Table 1). The sample was on average 36.9 years old and had been in their current profession for on average of 13.5 years. Two-thirds of the sample worked as hospital nurses or as nursing home nurses. Irritant contact dermatitis (ICD) was the most frequent dermatological diagnosis, and the diagnosis of allergic contact dermatitis (ACD) often occurred in combination with ICD (20). More than half of the sample showed an atopic skin diathesis. Almost 70% of the sample had at least one documented type IV sensitization. The most frequent type IV allergens were sulphate and fragrance-mix I. Those who completed HRQoL measures differed from those who did not in age and diagnosis. Non-completers ($n = 37$) were slightly older (mean = 40.8, $SD \pm 10.8$) than completers ($n = 241$) (mean = 36.2, $SD \pm 11.6$), $t = 2.4$, $P < 0.05$. The distribution of diagnoses was

Table 1. Demographics and clinical characteristics of health care workers (HCWs) ($n = 278$)

	<i>n</i>	%
Sex		
Male	21	7.6
Female	257	92.4
Age in years (M, SD)	36.9	11.6
Years in occupation (M, SD)	13.5	10.5
Duration of skin disease (M, SD)	6.2	7.7
Occupation		
Nurses	110	39.6
Carers/geriatric nurses	77	27.7
Medical/dental assistants	54	19.4
Others ^a	37	13.3
Diagnoses ^b		
Irritant contact dermatitis (ICD)	107	38.5
Atopic hand eczema (AHE)	22	7.9
Allergic contact dermatitis (ACD)	7	2.5
AHE + ICD	58	20.9
ACD + ICD	52	18.7
Others ^c	32	11.6
Atopic status		
Atopic skin diathesis		
No/unlikely/unclear (0–9)	124	44.6
Yes (≥ 10)	154	55.4
History of flexural eczema in anamnesis	66	23.7
Severity index		
No	96	34.5
Little	131	47.1
Some	20	7.2
Severe	31	11.2
Total	278	100
Most frequent documented type IV sensitizations ^d		
Nickel(II)-sulfate	93	33.5
Fragrance-mix I	39	14.0
Cobalt(II)-chloride	36	12.9
At least 1 type IV sensitization	194	69.8

^aPhysiotherapists, Educational/Occupational Therapists, Laboratory assistants, Dental technician, Doctors and Chiropodists/Beauticians.

^bDiagnoses according to Diepgen et al. (20).

^cAHE + ACD, ICD + AHE + ACD, dyshydrotic hand dermatitis, ICD with psoriasis, and contact urticaria.

^dMultiple responses.

also significantly different, $\chi^2(7) = 24.3$, $P < 0.01$. The largest deviation was found for the diagnosis ACD + ICD. 7.3% of non-completers and 23.3% of completers had this diagnosis.

SF-36

When comparing HCWs with suspected OSD with general population data, a MANOVA detected a significant effect for the grouping variable on the combined SF-36 dimensions, $F(8, 3083) = 20.46$, $P < 0.001$, $\eta^2 = 0.1$. Follow-up ANOVAs (Table 2) indicated significant differences for all dimensions. There was significantly more impairment in the general population sample in seven of the eight domains. PF, on the other hand, was significantly less impaired compared with the general population sample.

We also compared HCWs with suspected OSD with norms for patients with dermatoses (18). Again MANOVA produced a significant effect of the grouping variable on the combined SF-36 dimensions, $F(8, 340) = 5.31$, $P < 0.001$, $\eta^2 = 0.1$. Follow-up ANOVAs (Table 2) detected significantly less impairment in HCWs with suspected OSD for PF and general health perception. No other significant differences emerged.

HCWs with suspected OSD showed less impairment in PF and had a better general health perception than CKEs. A MANOVA detected a significant effect $F(8, 344) = 4.3$, $P < 0.001$, $\eta^2 = 0.09$ which was qualified by ANOVAs to refer to significant differences in PF [$M_{\text{HCWs}} = 89.6$ (SD = 13.1) versus $M_{\text{CKE}} = 81.4$ (SD = 22.1), $P < 0.01$] and general health perception [$M_{\text{HCWs}} = 63.1$ (SD = 18.1) versus $M_{\text{CKE}} = 57.8$ (SD = 21.4), $P < 0.05$].

Skinindex-29

Compared with data from the validation study of the German version of the Skindex-29, our sample had less impaired HRQoL than in-patients with mild psoriasis or atopic dermatitis, although tests for significance of the difference could not be conducted because data were not available for analysis (Table 3). When comparing HCWs with suspected OSD to CKE with suspected OSD from the Soder

Table 2. SF-36: comparison of health care workers (HCWs) with general population (standardization sample) and with chronic skin disorder population (standardization sample)

Dimension	HCWs [mean (SD) ($n = 236$)]	General population ^a [mean (SD) ($n = 2914$)]	Chronic skin disorders ^a [mean (SD) ($n = 120$)]
Physical functioning	89.6 (13.1)	85.7 (22.1)	79.9 (24.9)
Role-physical functioning	76.6 (32.3)	83.7 (31.7)	70.9 (37.5)
Role-emotional functioning	79.9 (33.8)	90.4 (25.6)	74.0 (37.5)
Social functioning	80.8 (21.6)	88.8 (18.4)	79.3 (22.5)
Pain	65.1 (19.7)	79.1 (27.4)	68.9 (29.3)
Vitality	54.2 (20.4)	63.3 (18.5)	53.9 (19.6)
Mental health	66.0 (26.8)	73.9 (16.4)	64.6 (17.6)
General health perception	63.1 (18.1)	68.1 (20.2)	56.8 (22.3)

Bold numbers indicate significant ($P < 0.001$) differences from HCWs. Lower values in SF-36 domains indicate greater health-related quality of life (HRQoL) impairment.

^aData from Bullinger and Kirchberger (18).

Table 3. Skindex-29: comparison of health care workers (HCWs) with data from Augustin et al. (13) and Soder et al. (19) data

	HCWs (<i>n</i> = 237)	Hospitalized mild ^a	Soder et al (19) ^b	<i>P</i> ^c
Functioning	1.1 (0.8)	2.3 (1.0)	0.9 (0.8)	n.s.
Emotion	1.9 (0.9)	2.9 (0.9)	1.6 (0.9)	n.s.
Symptom	2.4 (0.7)	2.7 (0.9)	2.3 (0.8)	n.s.
Total	1.7 (0.7)		1.5 (0.7)	n.s.

Higher values in Skindex-29 scales indicate a higher impact of the skin condition on health-related quality of life (HRQoL).

^aData for hospitalized in patients with psoriasis or atopic dermatitis (*n* = 37) from Augustin et al. (13).

^bData for 119 cleaning and kitchen employees (CKEs) from Soder et al. (19).

^c*P* for comparison between HCWs and CKEs with a suspected occupational skin disease (OSD) (19).

et al. (19) study, no significant differences emerged (Table 3).

Multivariate analyses of HRQoL with sex, age, duration of skin disease, atopic skin diathesis, severity of skin condition, and number of type IV sensitizations

SF-36 (Table 4). While controlling for all other variables, men had significantly better vitality than women. No other significant gender differences emerged. Increasing age was significantly associated with better general health perception but not with any other SF-36 scale. None of the SF-36 scales were significantly related to the duration of skin disease. We detected no significant associations between atopic skin diathesis and any of the SF-36 scales. A more severe skin condition was associated with more perceived pain but not with any of the other SF-36 dimensions. The number of type IV sensitizations was unrelated to any of the SF-36 dimensions. Univariate analyses produced the same results (results not shown).

Table 5. Results from multivariate regression analyses regressing Skindex-29 scales on sex, age, duration of skin disease, atopic skin diathesis, severity, and number of type IV sensitizations

	Functioning β	Emotion β	Symptom β
Sex ^a	0.13*	0.16*	0.11
Age ^b	0.02	−0.11	−0.11
Duration of skin disease ^b	−0.07	0.00	−0.04
Atopic skin diathesis	0.05	0.00	0.07
Severity index ^c	0.33***	0.32***	0.36***
Number of type IV sensitizations	0.05	0.01	0.04
Adj. <i>R</i> ²	0.11	0.10	0.14

^a1 = male and 2 = female.

^bIn years.

^c1 (no) to 4 (severe).

**P* < 0.05.

****P* < 0.001.

Skindex-29 (Table 5). Although controlling for all other variables, females showed significantly more physical and emotional but not symptom impairment than males. No significant association was observed between any of the subscales of the Skindex-29 and age. Duration of skin disease and atopic skin diathesis were also unrelated to the subscales of the Skindex-29. There were significant positive associations of all three subscales of Skindex-29 with the severity index. Number of type IV sensitizations was not significantly associated with any of the Skindex-29 scales. Univariate analyses produced the same results apart from the functioning score whose univariate association with sex was non-significant but became significant in multivariate regression (results not shown).

Discussion

We conducted a cross-sectional analysis to ascertain to what extent HRQoL is impaired in HCWs

Table 4. Results from multivariate regression analyses regressing SF-36 scales on sex, age, duration of skin disease, atopic skin diathesis, severity, and number of type IV sensitizations

	PF β	RPF β	REF β	SF β	Pain β	Vit β	MHI β	GHP β
Sex ^a	0.00	−0.11	−0.10	−0.07	−0.08	−0.13*	−0.11	−0.02
Age ^b	−0.07	−0.06	−0.03	0.07	0.12	0.08	0.04	0.14*
Duration of skin disease ^b	0.00	0.03	0.10	−0.01	−0.03	0.01	0.03	0.01
Atopic skin diathesis	−0.08	0.04	−0.05	−0.08	−0.09	0.02	−0.03	−0.06
Severity index ^c	−0.10	−0.07	0.00	0.00	−0.23**	0.00	−0.01	0.00
Number of type IV sensitizations	−0.07	0.06	0.01	−0.02	−0.06	0.04	0.03	−0.02
Adj. <i>R</i> ²	0.01	0.01	0.01	0.01	0.06	0.01	0.01	0.01

PF, physical functioning; RPF, role-physical functioning; REF, role-emotional functioning; SF, social functioning; Vit, vitality; MHI, mental health index; GHP, general health perception.

^a1 = male and 2 = female.

^bIn years.

^c1 (no) to 4 (severe).

**P* < 0.05.

***P* < 0.01.

with suspected OSD by comparing it with standardization data and other groups of patients with skin diseases and assess its association with variables assumed to be potentially predictive of HRQoL impairment.

SF-36

The present study found HCWs with suspected OSD to have significantly lower HRQoL as measured by the generic SF-36 in comparison to the general population on seven of the eight scales. Lundberg et al. (21) also found lower HRQoL (measured by SF-36) in patients with skin diseases as compared to the general population. With regard to PF, this pattern was reversed. Our sample reported less impact on PF than the standardization sample from the general population. Lan et al. (3) compared HCWs with and without hand eczema and found PF more impaired in HCWs with hand eczema; however, the difference was rather small (mean difference = 1.9), whereas the differences on the other scales were more substantial. The 10 items of the PF scale of the SF-36 inquire about the impact of one's health status on one's PF such as walking, lifting things, and doing exercise. HCWs with skin disease may not find that their skin disease impacts overly on their ability to do these activities. One explanation may be that by perceiving more of an impact in other areas, the subjective rating of PF may become comparatively better than it would otherwise be. Alternatively, they may have adapted to the skin disease by employing instrumental coping strategies which reduce the impact of the skin disease on PF. These interpretations need to be viewed with caution though as we do not know whether HCWs in general and irrespective of skin disease have higher PF than the general population. A future study could attempt to rule out this possibility by comparing a control group (matched HCWs without suspected OSD) with HCWs with OSD.

The comparison with the standardization sample with chronic skin diseases detected fewer differences. Again PF was perceived as less impaired by HCWs with suspected OSD, and they had a slightly better health perception than the standardization sample with chronic skin diseases. These results suggest that the generic SF-36 can detect an expected impact on HRQoL in individuals with skin disease including HCWs with a suspected OSD, however not all areas appear equally affected.

The independent relationship between SF-36 and severity of skin condition was confined to perceived pain only. The lack of a consistent relationship between HRQoL and severity of the skin condition mirrors previous research (11) and suggests that HRQoL impairment is not solely dependent on

disease severity but may be explained by an interaction with the patient's personality (22) and/or the ability to receive social support (23). In addition, the SF-36 is a generic HRQoL measure and may not be able to tap skin-specific aspects sufficiently. Older HCWs with suspected OSD perceived their health generally better than younger ones but no other association between SF-36 scales and age was found. Older individuals may not find the impact on general health so debilitating because they may consider the skin disease to be a specific rather than a general disease, whereas for younger individuals it may be more of a global burden. Men felt less exhausted and tired as a result of their physical health status (better vitality) than women replicating in part previous results (18). Duration of the skin disease was completely unrelated to any of the SF-36 scales suggesting no impact of duration of skin disease on HRQoL as measured by SF-36. Response shift theory (24) suggests that over time patients' perceptions as regards impairment by the disease change and may become more favourable.

Skindex-29

Our sample reported less HRQoL impairment as measured by the Skindex-29 than a sample of patients with mild forms of psoriasis or atopic dermatitis (13). However, a similar study (19) reported Skindex-29 scores akin to what was found in this study. We did, however, find all scales and the total of the Skindex-29 to be moderately associated with the severity index (while controlling for all other variables), which supports some previous research (12, 25, 26), but the finding is at odds with others (11). The relationship between HRQoL and severity appears to depend on whether HRQoL is measured generically or specifically as we did not find a relationship with HRQoL as measured by the generic SF-36 (apart from pain).

We also found a stronger impact of the skin condition on the emotion scale in women. Several studies reported few or no differences between gender with regard to HRQoL (2, 9, 27), whereas others stated that women are likely to feel more distress concerning their skin disease than men (28, 29). Noticeable is the fact that only very little variance in SF-36 domains (1–6%) but about 10–14% in the Skindex-29 scales was explained by these variables.

A limitation of this study is that it was cross-sectional in nature. Hence, it is not possible to analyse HRQoL by following the onset of disease. The male–female ratio was in favour of female HCWs with suspected OSD encumbering the detection of potential gender differences. Although females are over-represented in HCWs with a ratio of men to women in the population of HCWs is 1 to 5 (30), in

our survey only 8% were male. Thus, the observed gender differences need to be viewed with caution.

In summary, the present study found HRQoL as measured by the SF-36 significantly reduced in HCWs with suspected OSD when compared with the general population and of similar scope when compared with patients with skin diseases. HRQoL as measured by the Skindex-29 was similar in comparison to a study in which CKE with suspected OSD took part in a SIP course (19). HRQoL (Skindex-29) appeared less impaired in HCWs with suspected OSD in comparison to data for patients with skin diseases (13). Specific HRQoL in HCWs with suspected OSD may not be as impaired as one would expect. However, severity was consistently related to all Skindex-29 subscales but only to one SF-36 subscale. Future studies need to corroborate the finding of severity to be related to HRQoL when measured specifically and should also explore whether HCWs with suspected OSD use different coping strategies to deal with the impact of the skin disease than other groups of individuals with skin disease, which might explain the differences in HRQoL impairment we saw.

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Author contributions

Study concept and design (T. L. D. and E. W.); acquisition of data (S. S.); analysis and interpretation of data (U. M. and C. J. A.); drafting of the manuscript (U. M.); critical revision of the manuscript for important intellectual content (U. M., C. J. A., and E. W.); statistical expertise (U. M.) and study supervision (T. L. D. and E. W.).

References

- Dickel H, Bruckner T, Bernhard-Klimt C, Koch T, Scheidt R, Diepgen T L. Surveillance scheme for occupational skin disease in the Saarland, FRG. First report from BKH-S. *Contact Dermatitis* 2002; 46: 197–206.
- Skoet R, Zachariae R, Agner T. Contact dermatitis and quality of life: a structured review of the literature. *Br J Dermatol* 2003; 149: 452–456.
- Lan C C, Feng W W, Lu Y W et al. Hand eczema among University Hospital nursing staff: identification of high-risk sector and impact on quality of life. *Contact Dermatitis* 2008; 59: 301–306.
- van Coevorden A M, van Sonderen E, Bouma J, Coenraads P J. Assessment of severity of hand eczema: discrepancies between patient- and physician-rated scores. *Br J Dermatol* 2006; 155: 1217–1222.
- Cvetkovski R S, Zachariae R, Jensen H, Olsen J, Johansen J D, Agner T. Quality of life and depression in a population of occupational hand eczema patients. *Contact Dermatitis* 2006; 54: 106–111.
- Cvetkovski R S, Jensen H, Olsen J, Johansen J D, Agner T. Relation between patients' and physicians' severity assessment of occupational hand eczema. *Br J Dermatol* 2005; 153: 596–600.
- Wallenhammar L M, Nyfjall M, Lindberg M, Meding B. Health-related quality of life and hand eczema – a comparison of two instruments, including factor analysis. *J Invest Dermatol* 2004; 122: 1381–1389.
- Coenraads P J, Bouma J, Diepgen T L. Quality of life of patients with occupationally-induced hand eczema. *Der Hautarzt* 2004; 55: 28–30.
- Hutchings C V, Shum K W, Gawkrödger D J. Occupational contact dermatitis has an appreciable impact on quality of life. *Contact Dermatitis* 2001; 45: 17–20.
- Finlay A Y. Quality of life assessments in dermatology. *Semin Cutan Med Surg* 1998; 17: 291–296.
- Chren M-M, Lasek R J, Quinn L M, Mostow E N, Zyzanski S J. Skindex, a quality-of-life measure for patients with skin disease: reliability, validity, and responsiveness. *J Investig Dermatol* 1996; 107: 707–713.
- Abeni D, Picardi A, Pasquini P, Melchi C F, Chren M M. Further evidence of the validity and reliability of the Skindex-29: an Italian study on 2,242 dermatological outpatients. *Dermatology* 2002; 204: 43–49.
- Augustin M, Wenninger K, Amon U et al. German adaptation of the Skindex-29 questionnaire on quality of life in dermatology: validation and clinical results. *Dermatology* 2004; 209: 14–20.
- Both H, Essink-Bot M-L, Busschbach J, Nijsten T. Critical review of generic and dermatology-specific health-related quality of life instruments. *J Invest Dermatol* 2007; 127: 2726–2739.
- Weisshaar E, Radulescu M, Bock M, Albrecht U, Diepgen T L. Educational and dermatological aspects of secondary individual prevention in healthcare workers. *Contact Dermatitis* 2006; 54: 254–260.
- Weisshaar E, Radulescu M, Soder S et al. Secondary individual prevention of occupational skin diseases in health care workers, cleaners and kitchen employees: aims, experiences and descriptive results. *Int Arch Occup Environ Health* 2007; 80: 477–484.
- Ware J E Jr, Sherbourne C D. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care* 1992; 30: 473–483.
- Bullinger M, Kirchberger I. *SF-36-Fragebogen zum Gesundheitszustand – Handanweisung*. Göttingen, Hogrefe, 1998.
- Soder S, Diepgen T L, Radulescu M, Apfelbacher C J, Bruckner T, Weisshaar E. Occupational skin diseases in cleaning and kitchen employees: course and quality of life after measures of secondary. *J Dtsch Dermatol Ges* 2007; 5: 670–676.
- Diepgen T L, Andersen K E, Brandao F M et al. Hand eczema classification: a cross-sectional, multicentre study of the aetiology and morphology of hand eczema. *Br J Dermatol* 2008; doi: 10.1111/j.1365-2133.00808.08907.x.
- Lundberg L, Johannesson M, Silverdahl M, Hermansson C, Lindberg M. Health-related quality of life in patients with psoriasis and atopic dermatitis measured with SF-36, DLQI and a subjective measure of disease activity. *Acta Derm Venereol* 2000; 80: 430–434.
- Yamaoka K, Shigehisa T, Ogoshi K et al. Health-related quality of life varies with personality types: a comparison among cancer patients, non-cancer patients and healthy individuals in a Japanese population. *Qual Life Res* 1998; 7: 535–544.
- Bennett S J, Perkins S M, Lane K A, Deer M, Brater D C, Murray M D. Social support and health-related quality of

- life in chronic heart failure patients. *Qual Life Res* 2001; 10: 671–682.
24. Sprangers M A G, Schwartz C E. Integrating response shift into health-related quality of life research: a theoretical model. *Soc Sci Med* 1999; 48: 1507–1515.
25. Chren M-M, Lasek R J, Quinn L M, Covinsky K E. Convergent and discriminant validity of a generic and a disease-specific instrument to measure quality of life in patients with skin disease. *J Invest Dermatol* 1997; 108: 103–107.
26. Agner T, Andersen K E, Brandao F M et al. Hand eczema severity and quality of life: a cross-sectional, multicentre study of hand eczema patients. *Contact Dermatitis* 2008; 59: 43–47.
27. Holness D L. Results of a quality of life questionnaire in a patch test clinic population. *Contact Dermatitis* 2001; 44: 80–84.
28. Ginsburg I H. The psychosocial impact of skin disease. An overview. *Dermatol Clin* 1996; 14: 473–484.
29. Meding B. Differences between the sexes with regard to work-related skin disease. *Contact Dermatitis* 2000; 43: 65–71.
30. Federal Statistical Office. *Statistical yearbook for the Federal Republic of Germany: Statistisches Bundesamt (Federal Statistical Office)*, Wiesbaden, 2008.

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