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RESEARCH ARTICLE

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Associations of dry skin, skin care habits, well-being, sleep quality and itch in nursing home residents: Results of a multicentre, observational, cross-sectional study

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Abstract

Aim: Dry skin is one of the most frequent cutaneous problems in aged long-term care residents. Although it is clinically relevant, the impact on quality of life is unclear. The objective was to measure well-being, sleep quality and itch in nursing home residents being 65 years and older and to explore possible associations with demographics, dry skin and skincare habits.

Design: Multicentre, observational, cross-sectional.

Methods: Sleep quality was assessed with the Richards-Campbell Sleep Quality Questionnaire, well-being with the WHO-Five Well-being Index and itch with the 5-D Itch scale. Skin dryness was measured using the Overall Dry Skin score.

Results: A total of 51 residents were included. The item scores of the sleep quality and itch questionnaires were strongly associated with each other. Demographics, dry skin and skincare habits were not associated with the questionnaires. It is unclear whether basic skincare activities can improve the quality of life in this population.

KEYWORDS
nursing home, patient-reported outcome measures, skin care, sleep quality, well-being

1 | INTRODUCTION

Dry skin (xerosis cutis) is the most prevalent skin condition in aged long-term care residents (Hahnel, Blume-Peytavi, Trojahn, Dobos, Stroux, et al., 2017). The prevalence ranges from 45.3% (Kilic, Gul, Aslan, & Soylu, 2008; Lichterfeld, Lahmann, Blume-Peytavi, & Kottner, 2016) up to 99.1% (Hahnel, Blume-Peytavi, Trojahn, Dobos, Jahnke, et al., 2017). Mild forms are characterized by a rough, scaly and flaky skin surface. Severe skin dryness leads to cracks and fissures associated with inflammation, pain, bleeding and a high risk for secondary infection. Dry skin is the most common underlying cause for itch (pruritus) in the elderly(Valdes-Rodriguez, Stull, & Yosipovitch, 2015) and most often takes a chronic course (Berger, Shive, & Harper, 2013; Leslie, 2016). It has been suggested that itch in the older population over the age of 65 years can lead to reduced sleep quality and impairments in daily activities (Leslie, 2016; Valdes-Rodriguez et al., 2015). Especially, chronic pruritus seems to have a substantial impact on health-related quality of life (Kini et al., 2011) and shows a

Trial registration: The study is registered at https://clinicaltrials.gov/ct2/show/NCT02216526.

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strong association with the presence of dry skin (Lichterfeld-Kottner, Lahmann, Blume-Peytavi, Mueller-Werdan, & Kottner, 2018).

Structured skin care regimens are effective in reducing skin dryness and related pruritus (Hahnel, Blume-Peytavi, Trojahn, Dobos, Stroux, et al., 2017; Lechner et al., 2018; Theunis, Chaussade, Bourgeois, & Mengeaud, 2017). Therefore, it can be also assumed, that adequate skin care increases health-related quality of life and sleep quality and reduces itch in this group. At the same time, skin care habits in this population vary widely, for example due to gender differences, personal preferences, cultural reasons and self-care abilities (Rahn, Lahmann, Blume-Peytavi, & Kottner, 2016).

2 | BACKGROUND

Until now, it is unclear whether there are relationships between xerosis cutis, skin care habits and sleep quality, well-being and itch in nursing home residents aged 65 years or older. One reason is the realization of clinical research in the institutional long-term care (Heesters et al., 2017; Werner & Schicktanz, 2018). Research in this particular setting and the inclusion of nursing home residents in clinical studies are challenging (e.g., due to dementia and related difficulties of gathering informed consent; Scanlan, 2017). The current state of the evidence of associations of well-being, sleep quality and itch to demographics, dry skin and skin care habits in nursing home residents being 65 years and older is weak. However, measuring patient-reported outcome measures (PROMs) to improve care is of utmost importance (Greenhalgh et al., 2017).

The aim of this study was to measure well-being, sleep quality and itch and to examine whether itch was frequent in nursing home residents being 65 years and older. Applying an exploratory approach of this study, we aimed to explore possible relationships and/or associations with xerosis cutis, skin care habits and demographic characteristics.

3 | METHODS

3.1 | Study design

This was an exploratory, multicentre, observational and cross-sectional study conducted between September 2014–May 2015. A detailed description of the methods and procedures is described elsewhere (Hahnel, Blume-Peytavi, Trojahn, Dobos, Jahnke, et al., 2017). Here, we present results for a part of the whole study. Due to the exploratory approach of the study, no formal hypothesis testing was performed.

3.2 | Setting

The study was conducted in ten nursing homes in the federal state of Berlin, Germany. Using computer generated random numbers, nursing homes from a list of all existing nursing homes (N = 291) were contacted randomly. In case of non-response, the next randomly selected nursing home was invited.

3.3 | Participants

All residents living in the respective nursing home were invited to participate in this study. Kick-off meetings were conducted, and caregivers, legal representatives and residents were informed about the conduct and procedures. The inclusion criteria were as follows: (a) living in the nursing home at time of data collection; (b) aged ≥65 years; and (c) written informed consent (personally or by legal representative). Residents at the end of life were not considered for participation. Additionally, only residents being not cognitive impaired were invited to answer the questionnaires about well-being, sleep quality and itch. Written informed consent was obtained prior any study procedures.

3.4 | Variables

The aim of this study was to measure well-being, sleep quality and itch; therefore, we report the results of the WHO-Five Well-being Index, the Richards-Campbell Sleep Questionnaire (RCSQ) and the 5-D Itch scale.

Demographic characteristics of the residents including age, sex and duration of residency were documented. Physical function was measured with the Barthel Index (Mahoney & Barthel, 1965). The score ranges from 0 (very care dependent)–100 (not care dependent). Pressure ulcer (PU) risk was assessed with the Braden Score (Ayello & Braden, 2002). Scores range from 6 (high PU risk)–23 (no PU risk).

Xerosis cutis was assessed by the Overall Dry skin score (ODS; Serup, 1995). The ODS is a clinical score of the presence and severity of skin dryness. A score of '0' indicates the absence of skin dryness, whereas a score of '4' indicate severe skin dryness with inflammation and cracks. The validity of this score was recently supported (Kang et al., 2014). An ODS of ≥1 was categorized as xerosis cutis based on the five-point scale. Skin care habits were initially categorized as follows: 0 = never; 1 = 1× weekly—more rarely; 2 = 2–3× weekly; 3 = 1× daily; and 4 = 2–3× daily. For statistical analyses, the items were dichotomised into: 0 = once daily or more often (including categories 3 and 4) and 1 = less than once daily (including categories 0, 1 and 2).

A possible cognitive impairment was tested using the Six Item Cognitive Impairment Test (6-CIT; Brooke & Bullock, 1999). The assessment includes six simple questions, for example 'What year is it?' or 'Count backwards from 20–10'. Scores may range from 0 (=no signs of cognitive impairment) to a maximum score of 28 (=significant cognitive impairment). Residents with sum scores >8 were classified as 'cognitively impaired'. Only residents with sum scores ≤8 received the questionnaires about well-being, sleep quality and itch.

Well-being was assessed with the WHO-Five Well-being Index (Allgaier et al., 2013). The German version of the questionnaire published by the World Health Organization in 1998 was used. Scores range from '5' (all the time)–'0' (never) for in total of five items. Simple questions were asked about well-being in the last 2 weeks, for example 'In the last two weeks … I was happy' or '…I was relaxed'. The sum scores range from '0' (=the lowest well-being)–'25' (=the highest well-being). A cut-off score of <13 is recommended. The WHO-Five Well-Being Index was tested previously in an older population in the

German version we used. The reliability, in terms of internal consistency, was reported to be very high (α = 0.92; in terms of internal consistency; Brähler, Muehlan, Albani, & Schmidt, 2007) and showed a very high psychometric performance. The validity (coefficient of homogeneity: H = 0.47 (Bonsignore, Barkow, Jessen, & Heun, 2001), AUC (area under the curve) = 0.90; Allgaier et al., 2013) of the questionnaire was recently supported. Sleep quality was assessed with the Richards-Campbell Sleep Quality (RCSQ) Assessment (Richards, O'Sullivan, & Phillips, 2000). Five questions were asked about the sleep quality for the last night via 0–100 mm visual analogue scales. The RCSQ was tested either in critically ill patients (mean age 65.81 years) and reported a Cronbach's α of 0.90 and in older medical patients (mean age 79 years; Richards et al., 2000). Additionally, a literature review published in 2014 by Hoey et al. concluded the most usefulness of the RSCQ also in older patients (Hoey, Fulbrook, & Douglas, 2014). The interrater reliability (Kamdar et al., 2012) was also recently supported.

Itch was assessed with the 5-D Itch scale (Elman, Hynan, Gabriel, & Mayo, 2010). The score of the 5-D Itch scale ranges from '5' (no pruritus)–'25' (most severe pruritus) and contains five items measuring pruritus over the past 2 weeks. The test–retest reliability and reliability (internal consistency; α = 0.73; ICC = 0.96) of the 5-D itch scale was tested in 234 individuals with chronic pruritus and a mean age of 48 years (Elman et al., 2010).

All residents were interviewed about their skin care habits, including cleansing and application of leave-on products. Data were documented in structured source documents by trained study assistants. Variables for assessing skin care routines were as follows: (a) Washing habits; (b) Showering habits; (c) Bathing habits; (d) Moisturizing habits of the face and body; (e) Hair care; and (f) Shaving habits. For all variables, the frequency, skin areas, used skin care products and if the resident was able to perform the skin care by themselves or by the nurses were documented. In case of cognitive impairment of the resident, the respective nurse was asked or data were obtained from the medical records.

3.5 | Data sources and measurement

All procedures and assessments were performed onsite the nursing homes. Participating nursing home residents underwent a demographic, nursing, medical and dermatological examination. A board-certified dermatologist conducted a full skin assessment to assess the ODS. Demographic characteristics were extracted from the medical records. The residents without cognitive impairments answered questionnaires via interview through trained study assistants or by themselves.

3.6 | Bias

To ensure generalizability, nursing homes were randomly selected from all existing nursing homes in the federal state of Berlin, Germany. All study-related procedures and measurements were conducted by board-certified dermatologists and trained study assistants according to standard operating procedures.

3.7 | Study size

A formal sample size determination was not conducted because of the exploratory design of the study. In the main study, *N* = 223 nursing home residents were included. A calculation of the sample size of residents being able to answer the questionnaires was not conducted, depending on the exploratory design of the study. Previously published studies reported proportions of 53%–82.5% of cognitive impaired residents living in nursing homes in Europe (Auer et al., 2018; Bjork et al., 2016). Therefore, it was assumed that the proportion of residents being able to answer the questionnaires in our particular sample might be approximately between 20%–50%.

3.8 | Analysis

Only data of residents who were able to complete the questionnaires and were not cognitive impaired according the 6-CIT test were included in the statistical analyses. Demographic characteristics, skin care habits and results of the questionnaires of the residents were described descriptively using absolute and relative frequencies, means, medians and associated spread estimates (standard deviations, *SD*; interquartile ranges, IQR).

A correlation matrix was created to detect possible bivariate associations (Spearman's rho; r_s). A coefficient of ≥0.45 or ≤−0.45 was considered as a minimum level of association (Burnand, Kernan, & Feinstein, 1990). No formal hypothesis testing was performed, due to the exploratory approach of the study. Statistical analyses were done using SPSS 25.0.

3.9 | Ethics

The ethics committee of the Charité—Universitätsmedizin Berlin (EA1/190/14) approved the study. The study protocol was published previously (Kottner, Hahnel, et al., 2015), and the study was registered at clinicaltrials.gov.

4 | RESULTS

4.1 | Participant flow

The participation rate was lower than expected. Therefore, three additional nursing homes were recruited resulting in a total number of ten nursing homes. In total, *N* = 223 residents were eligible and enrolled in the study. Depending on the cognitive ability of the residents, *N* = 51 were included for answering the questionnaires about sleep quality, well-being and itch. Figure 1 shows the detailed participant flow and reasons for non-participating.

4.2 | Descriptive data

Baseline characteristics of the residents are shown in Table 1. The mean age of residents in the total sample was 83.6 years (*SD* 8.0), and most of the residents were female (67.7%). Due to the high number of cognitively impaired residents, only *N* = 51 were included in

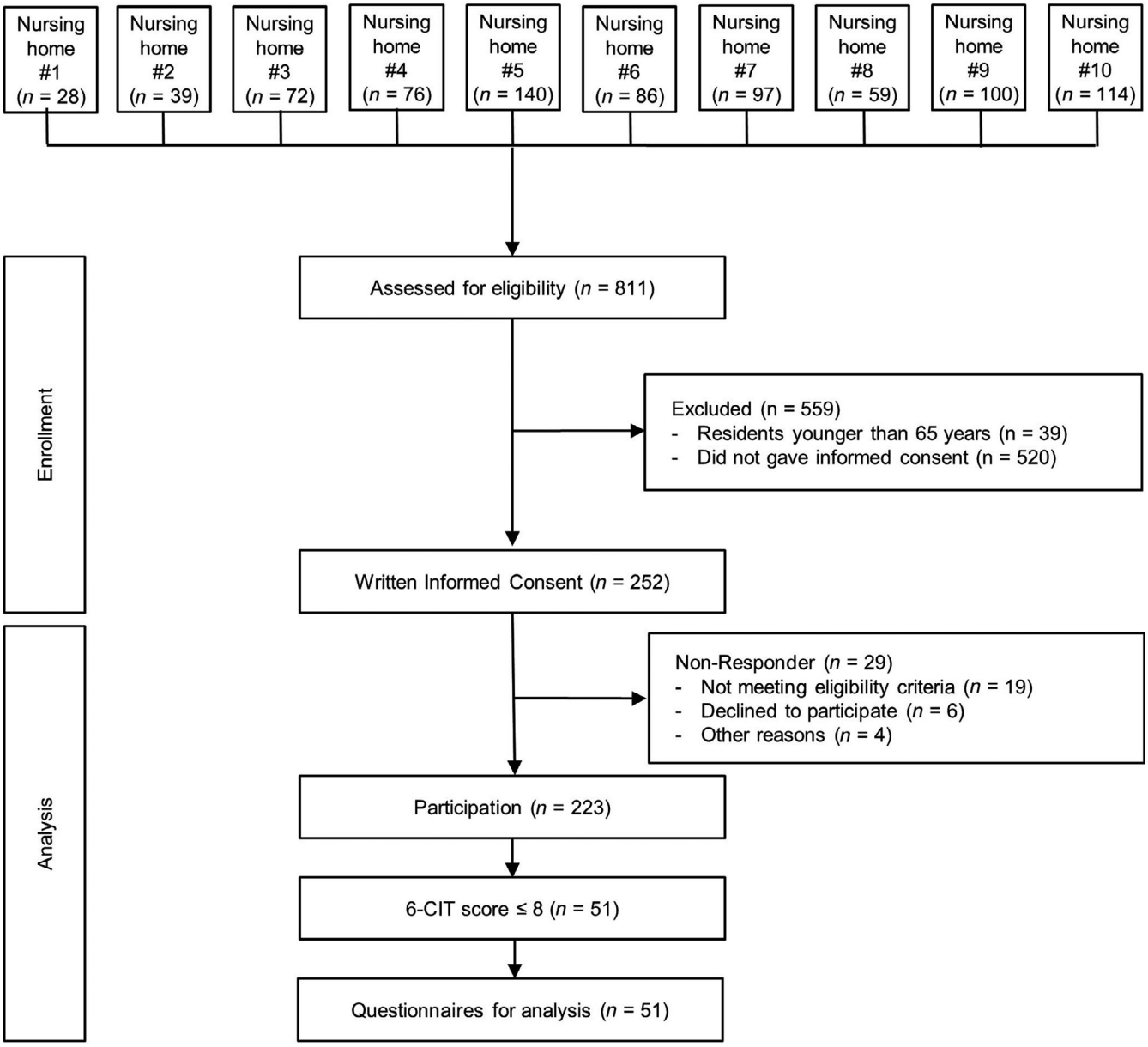

FIGURE 1 Flow chart

this analysis. These residents had higher Barthel Index total scores and higher Braden scale scores, indicating less care dependency and less PU risk, compared with the total sample. The ODS on the legs was higher, and the ODS on the arms was slightly higher in residents who were able to answer the questionnaires.

4.3 | Outcome data

4.3.1 | Skin care habits of nursing home residents

The 'cleansing' and 'moisturizing' habits of nursing home residents are shown in Tables 2 and 3. Most residents were washed or washed themselves once daily (64.7%), showered once a week or more rarely (29.4%) and washed their hairs once a week or more rarely (45.1%).

The most common frequency of applying leave-on products was once daily of the body or body parts (37.3%), face or neck (27.5%) and two to three times weekly for the body or body parts (27.5%).

4.3.2 | Resident reported outcomes

Results of the WHO-Five Well-Being Index and the RCSQ are presented in Table 4. The mean score of the WHO-Five Well-being Index was 16.2 (*SD* 6.4) and of the RCSQ 7.2 (*SD* 2.5). Results of item one of the RCSQ (sleep depth) showed the lowest mean value of 6.7 (*SD* 3.0), and the results of item four showed the highest mean value of 7.6 (*SD* 3.0).

Results of the 5-D Itch scale are presented in Table 5. The mean total score was 8.6 (*SD* 2.4). The most common affected skin area was the back (*N* = 16, 31.4%), followed by the thighs (*N* = 8, 15.7%), legs (*N* = 6, 11.8%), forearms (*N* = 5, 9.8%) and chest (*N* = 5, 9.8%).

TABLE 1 Demographic and sample characteristics

	Total sample (*N* = 223)	Residents completed the instruments (*N* = 51)
Female, *N* (%)	151 (67.7)	30 (58.8)
Age		
Mean (*SD*)	83.6 (8.0)	83.6 (8.4)
Median (IQR)	84 (78–89)	85 (78–91)
Cognitive impaired (6-CIT score)		
Mean (*SD*)	20.8 (10.9)	2.7 (2.7)
Median (IQR)	28 (10–28)	2 (0–6)
≥ 8, *N* (%)	172 (77.1)	N. a.
Barthel Index		
Mean (*SD*)	45.1 (23.8)[a]	57.2 (21.0)
Median (IQR)	45 (25–65)[a]	55 (45–70)
Braden score		
Mean (*SD*)	17.3 (3.7)[a]	19.4 (3.0)
Median (IQR)	18 (14–21)[a]	20 (16–22)
ODS arm		
Mean (*SD*)	1.8 (0.8)	1.9 (0.8)
Median (IQR)	2 (1–2)	2 (1–2)
ODS leg		
Mean (*SD*)	2.1 (1.0)[b]	2.4 (1.0)
Median (IQR)	2 (1–3)[b]	2 (2–3)
ODS trunk		
Mean (*SD*)	1.3 (0.8)[a]	1.3 (0.7)
Median (IQR)	1 (1–2)[a]	1 (1–2)

[a]*N* = 222.
[b]*N* = 214.

4.3.3 | Main results—Association of demographic characteristics, xerosis cutis, skin care habits and subjective well-being, sleep quality and itch

The strengths and directions of the bivariate associations (Spearman rho; r_s) are shown in Figure 2. Xerosis cutis on the arms was associated with xerosis cutis on the legs (r_s = 0.573). Age, sex and individual skin care habits including washing or showering frequencies seemed not to be associated with xerosis cutis.

The WHO-Five Well-Being Index total score seems not to be associated with age, sex, xerosis cutis, skin care habits, itch and sleep quality.

Overall, the RCSQ items were strongly associated with each other (e.g., increasing total scores were associated with deeper sleep [r_s = 0.891] and better sleep [r_s = 0.895]). The sleep quality seems to have no influence on age, sex, the degree of xerosis cutis, skin care habits, itch and well-being in nursing home residents.

Overall, the 5-D itch scale item scores were strongly associated with each other (e.g., itch intensity and impact on daily activities [r_s = 0.676] and itch total score and impact on daily activities [r_s = 0.693] or itch intensity [r_s = 0.857]). The items of the 5-D Itch scale seems not to be associated with age, sex, xerosis cutis, skin care habits, well-being and sleep quality in this population.

5 | DISCUSSION

5.1 | Key results

Results of this cross-sectional study confirm that most nursing home residents are cognitively impaired. Based on the cognitive ability of the residents, only *N* = 51 out of *N* = 223 residents were able to self-report outcomes. The ODS on the arms and legs as well as the single items of the RCSQ and 5-D itch scale were strongly associated with each other. Age, sex, xerosis cutis and individual skin care habits were not associated with subjective well-being, sleep quality and itch.

5.2 | Interpretation

Xerosis cutis is one of the most common skin disorders in the older people (Hahnel, Blume-Peytavi, Trojahn, Dobos, Jahnke, et al., 2017; Kilic et al., 2008; Lichterfeld et al., 2016). Evidence suggests a strong association with pruritus (Lichterfeld-Kottner et al., 2018), and due to the chronic lasting condition of itch, there seems to be a relation to quality of life or sleep quality (Kini et al., 2011; Leslie, 2016). Overall, no evidence of association between dry skin, skin care habits, well-being, sleep quality and itch in nursing home residents being 65 years and older were found in this study. Interestingly, in our sample residents being less care dependent seem to have dryer skin, especially on the lower legs, compared

TABLE 2 Frequency of skin cleansing routines (*N* = 51)

	Washing		Showering		Bathing		Hair Care		Shaving	
Frequency	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
1× weekly, more rarely	–	–	15	29.4	2	3.9	23	45.1	–	–
2–3× week	2	3.9	2	3.9	–	–	4	7.8	4	7.8
1× daily	33	64.7	5	9.8	–	–	1	2.0	2	3.9
2–3× daily	–	–	–	–	–	–	–	–	–	–
Frequency unknown	16	31.4	29	56.9	49	96.1	23	45.1	45	88.2

TABLE 3 Frequency of applying leave-on products (*N* = 51)

	Face/Neck		Body (or body parts)	
Frequency	***N***	**%**	***N***	**%**
Never	1	2.0	0	0
1× weekly, more rarely	1	2.0	3	5.9
2–3× week	3	5.9	14	27.5
1× daily	14	27.5	19	37.3
Frequency unknown	32	62.7	14	27.5

with the residents being more limited in their self-care abilities. A study published by Lechner et al. in 2018 and a study published by Lichterfeld-Kottner et al. in 2018 reported contrary results. Results of both studies indicate associations with increasing skin care dependency and skin dryness in nursing home residents (Lechner et al., 2018; Lichterfeld-Kottner et al., 2018). Additionally, an association of increasing skin dryness and decreasing mobility was shown (Lichterfeld-Kottner et al., 2018). The results of the WHO-Five Well-being Index are well comparable with previous reports in the older population (Bonsignore et al., 2001; Brähler et al., 2007) and depending of the cut-off score of ≤13 results indicate that the well-being of nursing home residents is less affected by demographic characteristics, xerosis cutis, sleep quality or itch. Single-item scores were associated with each other, supporting the structural validity of this instrument in this setting and population. At the same time, well-being in nursing home residents seems not to be associated with the examined variables, indicating that these phenomena seem to be independent. However, it is not entirely clear whether the five questions of this instrument reflect quality of life in this particular population and setting. We cannot exclude that the use of another instrument might led to other results.

To the best of our knowledge, this was the first study examining the RCSQ to measure subjective sleep quality in *N* = 51 nursing home residents 65 years and older. A study conducted by Missildine et al. in 2010 with *N* = 48 elder hospital patients showed a mean RCSQ of 4.1 in female and 6.1 in male patients, which is lower compared with our results. A strong correlation between sleep quality and age was also not found (Missildine, Bergstrom, Meininger, Richards, & Foreman, 2010). This indicates that long-term care residents in our study were not affected in their sleep quality. It might be that the circumstances (e.g., sleep environment, night time light and sound) in the hospital setting influence the subjective sleep quality in other ways than in the long-term care setting. We were able to show that the single-item scores of the RCSQ were strongly associated with each other, indicating a structural validity. There was no association with the severity of dry skin.

TABLE 4 Results of the WHO-Five Well-Being Index and the Richards-Campbell Sleep Questionnaire (*N* = 51)

Questionnaire	**Mean (*SD*)**
WHO-Five Well-Being Index (0–25)	16.2 (6.4)
Richards-Campbell Sleep Questionnaire (VAS)	7.2 (2.5)
Item 1: 'My sleep last night was: light—deep'	6.7 (3.0)
Item 2: 'Last night, the first time I got to sleep, I: just never could fall asleep—fell asleep almost immediately'	7.0 (3.2)
Item 3: 'Last night, I was: awake all night long—awake very little'	7.5 (2.6)
Item 4: 'Last night, when I woke up or was awakened: I couldn't get back to sleep—got back to sleep immediately'	7.6 (3.0)
Item 5: 'I would describe my sleep last night as: a bad night's sleep—a good night's sleep'	7.2 (2.8)

Abbreviation: VAS, visual analogue scale.

TABLE 5 Results of the 5-D Itch scale (*N* = 51)

5-D Itch scale item	***N* (%)**
1. During the last 2 weeks, how many hours a day have you been itching?	
<6 hr/day	49 (96.1)
6–12 hr/day	1 (2.0)
12–18 hr/day	0 (0.0)
18–23 hr/day	0 (0.0)
All day	1 (2.0)
2. Please rate the intensity of your itching over the past 2 weeks	
Not present	23 (45.1)
Mild	15 (29.4)
Moderate	13 (25.5)
Severe	0 (0.0)
Unbearable	0 (0.0)
3. Over the past 2 weeks has your itching gotten better or worse compared with the previous month?	
Completely resolved	9 (17.6)
Much better, but still present	2 (3.9)
Little bit better, but still present	2 (3.9)
Unchanged	27 (52.9)
Getting worse	1 (2.0)
4. Rate the impact of your itching on your sleep over the last 2 weeks	
Never affects sleep	44 (86.1)
Occasionally delays falling asleep	5 (9.8)
Frequently delays falling asleep	1 (2.0)
Delays falling asleep and occasionally wakes me up at night	1 (2.0)
Delays falling asleep and frequently wakes me up at night	0 (0.0)
5. Rate the impact of your itching on your daytime activities over the last 2 weeks	
Never affects activity	38 (74.5)
Rarely affects activity	10 (19.6)
Occasionally affects activity	3 (5.9)
Frequently affects activity	0 (0.0)
Always affects activity	0 (0.0)

	Age	Sex (1 = female/ 0 = male)	ODS arm	ODS leg	Moisturizing Body (once daily or more)	Skin Care Washing (once daily or more)	Skin Care Showering (once daily or more)	Well-being Index	1. Sleep quality: Sleep depth	2. Sleep quality: Time to fall asleep	3. Sleep quality: Nightly awakenings	4. Sleep quality: Falling asleep after awakenings	5. Sleep quality: Bad/ good	Sleep quality total score	1. Itch: Hours of itching	2. Itch: Intensity	3. Itch: Better/ worse	4. Itch: Impact on sleep	5. Itch: Impact on day activities	Itch total score
Age	1																			
Sex (1 = female/ 0 = male)	0.198	1																		
ODS arm	−0.048	−0.050	1																	
ODS leg	−0.115	0.046	**0.573**	1																
Moisturizing Body (once daily or more)	0.016	0.019	0.110	0.030	1															
Skin Care Washing (once daily or more)	−0.144	0.132	0.381	0.280	0.089	1														
Skin Care Showering (once daily or more)	−0.034	−0.126	0.221	−0.050	0.140	−0.170	1													
Well-being Index	−0.239	0.081	−0.124	−0.127	−0.090	−0.106	−0.090	1												
1. Sleep quality: Sleep depth	−0.256	0.050	0.031	0.062	0.027	0.192	0.141	0.122	1											
2. Sleep quality: Time to fall asleep	−0.253	0.228	0.186	0.114	−0.034	0.176	0.047	0.191	**0.629**	1										
3. Sleep quality: Nightly awakenings	−0.273	0.083	0.088	0.127	−0.174	0.085	0.126	0.165	**0.664**	**0.630**	1									
4. Sleep quality: Falling asleep after awakenings	−0.333	0.053	0.131	0.024	0.029	0.076	0.078	0.185	**0.719**	**0.724**	**0.724**	1								
5. Sleep quality: Bad/good	−0.257	0.126	0.107	0.033	−0.041	0.109	0.132	0.229	**0.783**	**0.719**	**0.713**	**0.752**	1							
Sleep quality total score	−0.310	0.107	0.140	0.127	−0.056	0.202	0.152	0.188	**0.891**	**0.811**	**0.835**	**0.848**	**0.895**	1						
1. Itch: Hours of itching	−0.265	−0.032	−0.107	−0.068	0.041	0.149	−0.067	0.061	−0.060	0.132	0.234	0.195	−0.178	−0.001	1					
2. Itch: Intensity	0.078	−0.108	0.080	0.262	−0.018	−0.096	−0.178	0.028	−0.135	−0.096	0.003	−0.203	−0.093	−0.106	0.074	1				
3. Itch: Better/worse	−0.082	0.015	0.291	0.367	0.057	0.135	0.060	−0.091	0.176	0.143	0.200	0.138	0.059	0.222	0.137	0.345	1			
4. Itch: Impact on sleep	0.079	−0.129	0.216	0.205	−0.082	0.065	−0.131	−0.165	−0.139	0.027	−0.163	−0.260	−0.128	−0.122	−0.080	0.440	0.101	1		
5. Itch: Impact on day activities	−0.042	−0.073	0.159	0.370	0.050	0.205	−0.191	0.047	0.060	−0.079	0.039	−0.086	−0.100	−0.019	0.095	**0.676**	0.189	0.400	1	
Itch total score	−0.054	−0.004	0.138	0.377	−0.009	0.093	−0.161	−0.072	−0.081	0.015	0.088	−0.068	−0.164	−0.019	0.310	**0.857**	**0.683**	**0.489**	**0.693**	1

FIGURE 2 Correlation matrix (bold and underlined marking indicate $r_s \geq 0.45$ or $r_s \leq -0.45$)

The single-item scores of the 5-D itch scale showed strong associations with each other indicating that this instrument worked in this setting and population. Overall results indicate that itch was a minor problem. Itch was not present in nearly half of the residents and additionally in nearly one-third only mild. Furthermore, even when a resident was affected by itch, they reported that itch does not influence sleep quality or daily activities. Current evidence suggests relationships between pruritus and xerosis cutis as well as sleep quality and well-being. We were not able to reproduce this finding. A study published in 2017 (Theunis et al., 2017) showed that in older people affected by pruritus and moderate to severe xerosis cutis, the duration of pruritus in older people was mainly <6 hr/day, the pruritus over the past 2 weeks was mainly unchanged, and the pruritus did not affect sleep quality and daily activities, which support our results.

To the best of our knowledge, this was the first study examining associations of skin care habits and well-being, sleep quality and itch in elder nursing home residents. A study published in 2014 with *N* = 879 home care receivers (mean age 78.1 years, mean Barthel Index 61.8) showed that the washing frequency was mostly once daily (77%) and most applied moisturizer once daily (Kottner, Boronat, Blume-Peytavi, Lahmann, & Suhr, 2015), which is similar to our results. The showering frequency for most was two times a week, whereas in our sample the frequency was less than once a week. Another study reported bathing or showering frequencies in older people 5.4 times a week (Beauregard & Gilchrest, 1987). Comparisons with other studies are difficult, because evidence is lacking or different settings and populations were studied. Furthermore, evidence reporting associations of skin care habits and well-being, sleep quality and itch in the institutional long-term care are totally missing. In our study, individual skin care habits, age and sex of the nursing home residents seem not to have an influence on the measured patient-reported outcomes. Furthermore, the individual skin care habits vary in terms of frequency and kind (e.g., bathing, washing, or showering). Due to the small sample, we dichotomized the variables. Nevertheless, we were not able to show associations. In addition, even if we choose the best available instruments for this population, it is possible that these instruments did not reflect the subjective most important items for nursing home residents being 65 years or older.

5.3 | Limitations

Cognitive impaired residents were excluded, which might have led to a selection bias and to a reduced generalizability. On the other hand, a possible selection bias might be unlikely due to the population-based approach and randomly selected nursing homes. Depending on the cognitive abilities of the nursing home residents, the sample of *N* = 51 was small. Whether this has an effect on the results is unclear. Data about subjective reported sleep quality, well-being, itch

and individual skin care habits in elder nursing home residents are rare, limiting the comparability of our results.

5.4 | Generalizability

Demographic characteristics of the nursing home residents about age, sex and care dependency are well comparable with the general German long-term care population (Bundesamt, 2015), indicating a good external validity. Despite the random selection of nursing homes, there were differences between participating and non-participating institutions (e.g., in terms of ownership and size), which may limit the generalizability.

6 | CONCLUSION

For the first time, this study describes individual skin care habits in nursing home residents being 65 years or older and examines relationships with demographic characteristics, xerosis cutis and patient-reported outcome measures. The individual skin care habits in this particular population vary widely. Because most nursing home residents were affected by cognitive impairments, only N = 51 residents were able to answer the questionnaires about well-being, sleep quality and itch. There were no associations between dry skin, itch and quality of life and sleep indicating that other factors seem to be more important. The strong associations of the single-item scores of the WHO-Five Well-being Index and the 5-D Itch scale indicate that these instruments seem to be valid in this population. Even if associations between the patient-reported outcomes, xerosis cutis, skin care habits and demographic characteristics were not shown, the resident perspective about well-being, sleep quality and itch is important. Additionally, the inclusion of cognitive impaired residents and the assessment of proxy-rated well-being, sleep and itch are needed for future research in this particular setting and population. The documentation of scratched lesions and scratch behaviour might be used as an indirect measurement of itch, and actigraphy may serve as a measurement of sleep. However, evidence is needed to show whether and to what extend basic hygiene activities can improve the quality of life of aged long-term care residents.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests and are alone responsible for the content and writing of the paper. The funding support of Galderma Pharma SA (Switzerland) had no influence on study planning, protocol preparation, study conduct, analyses and reporting.

AUTHORS CONTRIBUTION

Elisabeth Hahnel: research associate and coordinator of the conducted study, substantial contributions to conception and design and acquisition, analysis and interpretation of data and preparation of the article. Ulrike Blume-Peytavi: substantial contributions to conception and design, dermatological examinations, preparation and review of the article. Jan Kottner: substantial contributions to conception and design, analysis and interpretation of data, preparation and review of the article.

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