Validation of quality of life and work productivity instruments in patients with chronic hand dermatitis

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INTRODUCTION

- Chronic hand dermatitis (ChHD) is an embarrassing and painful inflammatory skin condition which can have a negative impact on quality of life (QoL) and work productivity
- Valid and reliable (reproducible) measures are needed to evaluate the effectiveness of ChHD therapeutic interventions in improving QoL and reducing work impairment
- The objective of this study was to assess the validity, reproducibility and responsiveness of the Dermatology Life Quality Index (DLQI)[1] and the Work Productivity and Activity Impairment questionnaire-Chronic Hand Dermatitis (WPAI-ChHD)[2]

METHODS

Study design

- This analysis was conducted as part of a multicenter, randomized, double-blind, controlled, parallel-group, 22-day study that assessed the efficacy and safety of pimecrolimus cream 1% in subjects with ChHD
- Subjects were randomized 1:1 to pimecrolimus cream 1% or vehicle
- The controlled study was followed by a 23-week open-label study
- Subjects completed self-administered questionnaires at baseline, day 22 and week 26

Subjects

- A total of 257 males and females aged 18–86 years with mild to moderate ChHD present for at least 6 weeks were included in the baseline analyses; 240 subjects were included in the day 22 analyses and 215 subjects were included in the week 26 analyses

QoL and work productivity measures

DLQI

- Measures six disease-specific domains, i.e., symptoms and feelings, leisure activities, daily activities, work and school, personal relationships, and treatment
- Items are rated on a 4-point scale (0 = not at all, to 3 = very much)
- Individual items are summed to generate an overall QoL score, and scores are expressed as percentages, with higher scores indicating greater impairment
- Recall period is the last 7 days

WPAI-ChHD

- Measures work and classroom absenteeism and productivity
- Scores are expressed as percentages, with higher scores indicating greater impairment
- Recall period is the last 7 days

Evaluations

The following properties of the DLQI and WPAI-ChHD were assessed:

Discriminative validity – ability to differentiate between patients with greater and lesser condition severity

Evaluative validity – response to changes in condition severity

Responsiveness to clinically meaningful change in condition severity over time

Reproducibility – reliability when there was no change in condition severity

- The independent measures of disease severity used in the analyses were:
  - **Investigators' Global Assessment (IGA)** – scored on a 5-point scale, with treatment success defined by a score of 0 (clear) or 1 (almost clear) on the target hand
  - **Total Key Signs and Symptoms (TSS)** – scored on a 4-point scale, with treatment success defined by a score of 0 or 1 on each of four symptoms (erythema, scaling, erosions/fissures, and pruritus/burning)
  - **Subject's Overall Self-Assessment (SOSA)** – scored on a 4-point scale, with treatment success defined as a score of 0 or 1
- A subject was considered to be stable if the TSS change was no more than one unit and IGA and SOSA did not change

Statistical analysis

- Analysis of covariance (ANCOVA) was used to test relationships between the impairment measures and disease severity measures, using baseline score, center and treatment group as covariates
- Wilcoxon signed rank tests were used to test reproducibility
- A p-value < 0.05 was required for significance using two-sided hypothesis tests

RESULTS

Baseline demographics

- Table 1 shows the demographic characteristics, disease severity, QoL and work impairment of the subjects included in the testing
- The number of students participating in the study ($n = 28$) was too small to evaluate classroom absenteeism and productivity; these measures in the WPAI-ChHD were not validated

Table 1. Baseline demographics, disease severity and QoL and work productivity impairment

Baseline variable	Mean ± SD ($n = 257$)
Age (years)	44.9 ± 13.3
Gender (% female)	57
Race (% Caucasian)	85
Employed (%)	78
Student (%)	11
Investigators' Global Assessment (IGA)	2.72 ± 0.55
Total Key Symptoms Score (TSS)	6.27 ± 1.96
Subject's Overall Self-Assessment (SOSA)	2.25 ± 0.68
DLQI (%)	
Total	25.1 ± 17.4
Symptoms and feelings	54.6 ± 25.6
Daily activities	19.6 ± 22.8
Leisure activities	18.2 ± 23.5
Work and school	26.5 ± 27.8
Personal relationships	10.6 ± 17.3
Treatment	18.8 ± 22.9
WPAI-ChHD (%)	
Work time missed	0.3 ± 3.7 ($n = 196$)
Work impairment	17.7 ± 22.3 ($n = 197$)
Activity impairment	24.6 ± 25.3

Discriminative validity

- Low disease severity scores (IGA, TSS and SOSA) were significant predictors of low DLQI scores at baseline, day 22 and week 26 ($p = 0.01$ to < 0.001), with the exception of the DLQI treatment score ($p = 0.09$ to < 0.001)
- Low disease severity scores were also significant predictors of low impairment at work, overall work impairment, and activity impairment ($p = 0.05$ to < 0.001) as measured by the WPAI-ChHD
- Disease severity measures were not significant predictors of missed work time

Evaluative validity

- Improvements in disease severity scores (IGA, TSS and SOSA) from baseline to day 22 and from baseline to week 26 were significant predictors of improvement in all DLQI scores ($p = 0.03$ to < 0.001)
- Improvements in disease severity measures were also significant predictors of improvement in WPAI-ChHD measures of impairment at work, overall work impairment, and activity impairment ($p = 0.002$ to < 0.001)
- Disease severity measures were not significant predictors of change in missed work time

Responsiveness (Table 2)

- Treatment success at day 22 and week 26 was a significant predictor of improvement in DLQI scores ($p = 0.032$ to < 0.001), for all but the DLQI personal relationships score at day 22 ($p = 0.114$ to 0.08).
- Treatment success at day 22 and week 26 was also a significant predictor of improvement in WPAI-ChHD scores ($p = 0.008$ to < 0.001), except for work time missed

Reproducibility

- For patients with stable disease severity there were no significant changes from baseline to day 22 or from baseline to week 26 in DLQI scores ($p = 0.95$ to 0.12), work impairment scores ($p = 1.00$ to 0.12) or activity impairment ($p = 0.07$).

Table 2. Responsiveness to clinically meaningful change: p-values* from analysis of covariance summary for the effect of success/failure measured by IGA, TSS and SOSA on the prediction of change from baseline in DLQI and WPAI-ChHD scores**

	Measures of disease severity					
	IGA		TSS		SOSA	
	Assessment period		Assessment period		Assessment period	
	Day 22	Week 26	Day 22	Week 26	Day 22	Week 26
DLQI						
Total	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Symptoms and feelings	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Daily activities	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Leisure activities	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Work and school	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Personal relationships	0.079	0.001	0.114	< 0.001	0.009	< 0.001
Treatment	0.030	0.001	0.009	0.001	0.032	0.003
WPAI-ChHD						
Work time missed	0.578	0.413	0.313	0.334	0.477	0.376
Work impairment	0.008	< 0.001	0.001	< 0.001	0.005	< 0.001
Activity impairment	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

* For all statistically significant p values, success in IGA, TSS and SOSA scores resulted in a decreased chance of change in effect.

** With baseline score, treatment center and drug treatment (pimecrolimus cream 1%/pimecrolimus cream 1% vs vehicle/pimecrolimus cream 1%) as covariates. Success is defined as: for IGA, 0 (clear) or 1 (almost clear); for TSS, 0 (absent) or 1 (mild); for SOSA, 0 (complete disease control) or 1 (good disease control).

Based on the results of this study we recommend that the DLQI and WPAI-ChHD be included in investigations of ChHD since they are valid measures of the impact of the disease on the patient's quality of life and work productivity

The WPAI-ChHD will also be useful in estimating the indirect costs of mild to moderate ChHD

CONCLUSIONS

- **The *discriminative* and *evaluative* validity of DLQI measures and WPAI-ChHD measures of impairment at work, overall work impairment and activity impairment were established, with the exception of work time missed (possibly due to the low rate of absenteeism)**
- **Similarly, the *responsiveness* of these measures to clinically meaningful change was established, again with the exception of work time missed (possibly due to the low rate of absenteeism)**
- ***The reproducibility* of all impairment measures was established by showing a lack of change in scores in patients with stable disease severity**

REFERENCES

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