| RDIFF VERSITY SGOL | Further validation of the Dermatology Life Quality Index (DLQI) using a 13 European country dataset | DLQI |
|--------------------------|---|---------------------------|
| ity of UF | Salek MS ¹ , Johns JR ² , Ali FM ² , Dalgard FJ ³ , Kupfer J ⁴ , Finlay AY ² 1) School of Life and Medical Sciences, University of Hertfordshire, Hatfield, UK 2) Division of Infection and Immunity, School of Medicine, Cardiff University, Cardiff, UK 3) National Center for Dual Diagnosis, Innlandet Hospital Trust, Brumundal, Norway 4) Institute of Medical Psychology, Justus Liebig University, Giessen, Germany | PCR63 |
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DOUCTION The DLQI is the most widely used tool for clinicians and researchers to understand the impact of skin diseases on patients' physical and psychosocial functioning as well as to assess the effectiveness of interventions. The DLQI has been used in >454 randomised controlled trials¹ (as primary outcomes in >24)², as a benchmark for validating >100 PROs³, is incorporated in guidelines or registries in >45 countries and is available in 138 translations.

Aim To further validate the DLQI using a 13-country European multicentre observational study dataset.

Methods Data from a European multicentre observational cross-sectional

- CFA fit statistics for 1-factor solution were acceptable.
- Further factors did not significantly improve model fit.
- Reliability by Cronbach's alpha was 0.900.
- IRT indicated good fit statistics, no misfitting items (infit and outfit t(between -2 to +2)).
- No local dependence (all LG2<0.2), all Q3<0.27 cutoff

| ltem | outfit | z.outfit | infit | z.infit |
|------|--------|----------|-------|---------|
| 1 | 0.974 | -1.042 | 1.080 | 3.287 |
| 2 | 0.812 | -7.021 | 0.913 | -3.645 |
| 3 | 0.557 | -9.382 | 0.753 | -9.151 |
| 4 | 0.795 | -4.308 | 0.984 | -0.551 |
| 5 | 0.499 | -13.139 | 0.660 | -13.913 |
| 6 | 0.700 | -4.308 | 1.012 | 0.358 |
| 7 | 0.935 | -1.18 | 1.138 | 4.334 |
| 8 | 0.575 | -9.034 | 0.793 | -7.261 |
| 9 | 0.874 | -1.452 | 1.135 | 3.484 |
| 10 | 0.809 | -3.506 | 1.018 | 0.605 |

Observed vs Expected Values for Item



study⁴ conducted in 13 countries were analysed. In each dermatology clinic, 250 consecutive adult out-patients were recruited. The dataset contains DLQI raw scores, EQ-5D 3-level, visual analogue scale and physician assessed disease severity. Factors were extracted until the Eigenvalues of the real data were less than the corresponding Eigenvalues of a random data set of the same size using parallel analysis. Confirmatory factor analysis (CFA) was performed using R package (Lavaan) to examine whether the data fit the predetermined 1-factor model. Item response theory (IRT) was performed by IRTPRO and R, Cronbach's alpha, correlations and effect sizes in R.

Results

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- From 3,635 patients, 3408 patients completed the DLQI questionnaire with no missing data.
- 55.8% of patients were female and mean age was 46.6 years (SD 17.8).
- The commonest conditions were: psoriasis (17.4%), non-melanoma skin cancer (10.9%), pyoderma gangrenosum (9.5%), recurrent herpes simplex (6.7%), eczema (6.2%), acne (6.2%), nevi (5.0%), atopic dermatitis (4.5%), epidermal cyst (4.2%), eczema (contact dermatitis) (4.1%) and leg ulcers (2.8%).





| Spearman's rho correlations with DLQI sum score | | | | | |
|---|-------|--|--|--|--|
| EQ-5D mobility | 0.211 | | | | |
| EO ED colfeara | 0 257 | | | | |

Using the DLQI score meaning banding, their disease had no effect (n=962, 28.2%), small effect (912, 26.8%), moderate effect (674, 19.8%), very large effect (691, 20.3%) and extremely large effect (169, 5.0%) on their quality of life. This means that 1534 (45.1%) of patients fell into having a large impact on their QoL when alarm bells should start ringing as further action would be required. Inter-item correlation values were between 0.15 to 0.65 indicating good correlation with no values < 0.15 (indicating poor correlation).

| Correlation plot from data | | | | | | | | | | | |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|------|-------|--------|--|
| dlqi1 — | 1.00 | 0.50 | 0.51 | 0.41 | 0.47 | 0.37 | 0.40 | 0.41 | 0.32 | 0.40 | |
| dlqi2 – | 0.50 | 1.00 | 0.56 | 0.49 | 0.62 | 0.36 | 0.46 | 0.53 | 0.37 | 0.39 | |
| dlqi3 — | 0.51 | 0.56 | 1.00 | 0.53 | 0.66 | 0.51 | 0.56 | 0.53 | 0.38 | 0.50 | |
| dlqi4 – | 0.41 | 0.49 | 0.53 | 1.00 | 0.61 | 0.47 | 0.39 | 0.51 | 0.38 | 0.47 | |
| dlqi5 — | 0.47 | 0.62 | 0.66 | 0.61 | 1.00 | 0.59 | 0.53 | 0.63 | 0.44 | 0.49 | |
| dlqi6 — | 0.37 | 0.36 | 0.51 | 0.47 | 0.59 | 1.00 | 0.45 | 0.46 | 0.41 | 0.44 | |
| dlqi7 – | 0.40 | 0.46 | 0.56 | 0.39 | 0.53 | 0.45 | 1.00 | 0.44 | 0.31 | 0.42 | |
| dlqi8 — | 0.41 | 0.53 | 0.53 | 0.51 | 0.63 | 0.46 | 0.44 | 1.00 | 0.64 | 0.49 | |
| dlqi9 — | 0.32 | 0.37 | 0.38 | 0.38 | 0.44 | 0.41 | 0.31 | 0.64 | 1.00 | 0.43 | |
| dlqi10 – | 0.40 | 0.39 | 0.50 | 0.47 | 0.49 | 0.44 | 0.42 | 0.49 | 0.43 | 1.00 | |
| | dlai1 | dlai2 | dlai3 | dlaiA | dlai5 | dlai6 | dlai7 | dlai | dlai0 | digi10 | |

Parallel analysis and Eigenvalues and Very Simple

| Eigenvalues | 1 | 2 | 3 | 4 | 5 |
|-------------|-------|-------|-------|-------|-------|
| 1 factor | 4.788 | 0.305 | 0.140 | 0.092 | 0.048 |
| 2-factor | 4.839 | 0.521 | 0.152 | 0.115 | 0.064 |
| 3-factor | 4.865 | 0.512 | 0.206 | 0.154 | 0.074 |
| 4-factor | 4.913 | 0.553 | 0.309 | 0.236 | 0.080 |

| Confirmatory | | Items | Items |
|-------------------|----------|------------|----------|
| Factor Analysis | | 1-5,7:6,8- | 1-7:8-10 |
| | | 10 | |
| Latent variable | | | |
| estimates | 1-factor | 2-factor | 2-factor |
| dlqi1 | 0.603 | 0.609 | 0.605 |
| dlqi2 | 0.702 | 0.717 | 0.709 |
| dlqi3 | 0.779 | 0.790 | 0.788 |
| dlqi4 | 0.696 | 0.696 | 0.696 |
| dlqi5 | 0.841 | 0.847 | 0.852 |
| dlqi6 | 0.658 | 0.659 | 0.642 |
| dlqi7 | 0.637 | 0.641 | 0.658 |
| dlqi8 | 0.745 | 0.803 | 0.855 |
| dlqi9 | 0.578 | 0.662 | 0.699 |
| dlqi10 | 0.633 | 0.652 | 0.630 |
| Fit statistics | | | |
| RMSEA | 0.104 | 0.094 | 0.086 |
| Lower 90% Cl | | | |
| RMSEA | 0.099 | 0.089 | 0.081 |
| Upper 90% Cl | | | |
| RMSEA | 0.109 | 0.099 | 0.091 |
| CFI | 0.920 | 0.936 | 0.947 |
| TLI | 0.897 | 0.916 | 0.930 |
| NFI | 0.918 | 0.918 | 0.918 |
| BIC | 82048 | 81793 | 81620 |
| SRMR | 0.044 | 0.041 | 0.042 |
| Reliability f1 | | | |
| Alpha | 0.900 | 0.864 | 0.874 |
| Omega | 0.901 | 0.865 | 0.876 |
| Omega2 | 0.901 | 0.865 | 0.876 |
| Omega3 | 0.900 | 0.864 | 0.877 |
| Ave var extracted | 0.479 | 0.521 | 0.506 |
| Reliability f2 | | | |
| Alpha | | 0.786 | 0.765 |
| Omega | | 0.789 | 0.775 |
| Omega2 | | 0.789 | 0.775 |
| Omega3 | | 0.791 | 0.779 |
| Ave var extracted | | 0.486 | 0.539 |

for differences in question difficulty.

spontaneous response, accounting

Correlations of DLQI sum score with EQ-5D items, EQ-5D VAS, age and severity were all significant (p<0.001).

| | 0.237 |
|--------------------------|--------|
| EQ-5D activity | 0.370 |
| EQ-5D pain | 0.409 |
| EQ-5D anxiety/depression | 0.365 |
| EQ-5D VAS | -0.409 |
| Age | -0.119 |
| Severity | 0.407 |
| | |

| Effect size | Mean | Missing | Νο | Some | Extreme | Cohen's d | 95% Cl- Lower | 95% Cl- Upper |
|--------------------------------------|-------|---------|------|------|---------|-----------|------------------|------------------|
| EQ5D mobility no to some | 1.245 | 58 | 2540 | 799 | 11 | 0.716 | 0.635 | 0.798 |
| EQ5D mobility some to extreme | | | | | | 0.846 | 0.248 | 1.443 |
| EQ5D self-care no to some | 1.110 | 53 | 2996 | 350 | 9 | 0.683 | 0.571 | 0.795 |
| EQ5D self-care some to extreme | | | | | | 1.223 | 0.553 | 1.893 |
| EQ5D activity no to some | 1.277 | 53 | 2478 | 825 | 52 | 0.730 | 0.649 | 0.811 |
| EQ5D activity some to extreme | | | | | | 1.249 | 0.958 | 1.541 |
| EQ5D pain no to some | 1.606 | 55 | 1508 | 1657 | 188 | 0.773 | 0.700 | 0.845 |
| EQ5D pain some to extreme | | | | | | 1.028 | 0.873 | 1.182 |
| EQ5D anxiety/depression no to some | 1.492 | 61 | 1849 | 1348 | 150 | 0.817 | 0.744 | 0.891 |
| EQ5D anxiety/depression some to extr | | | | | | 1.106 | 0.932 | 1.280 |

| Severity effect size | Mean | Missing | Mild | Moderate | Severe | Cohen's d | CI-Lower | Cl-Upper |
|----------------------|-------|---------|------|----------|--------|-----------|-----------------|----------|
| Mild to moderate | 1.787 | 379 | 152 | 1371 | 506 | 0.898 | 0.815 | 0.980 |
| Moderate to severe | | | | | | 1.112 | 1.003 | 1.221 |

Cohen's d effect sizes were large between

> < 2.22e-16</p>

Structure (VSS) indicated unidimensionality of the DLQI.



different levels of disease severity.

Known group validity analysis of DLQI total score by severity was significant between groups (Kruskal-Wallis Test p<0.001).



mild moderate severity

Conclusions The DLQI showed good psychometric properties in this large study dataset using both classical test theory as well as IRT, supporting unidimensionality of the DLQI.

References

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