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<td>Limits of agreement reflected in Bland-Altman plot, data on difference in UCSD-SOBQ scores across evaluated time points not provided, however, authors describe LoA&lt;MCID;</td>
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Measurement error:
- D12
- ERS-IPF-B
- FACIT-DS
- KBILD-B
- MRC
- NS
- OCD
- PROMIS-DS
- UCSD-SOBQ

Very low: 1 Inadequate quality study = serious risk of bias = -3 levels

Imprecision: only 30 patients = -2 levels
### Table: Construct validity: Hypothesis testing (comparison of scores between measures / group comparisons)

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<th>Hypothesis Testing</th>
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<td>Impact $r = -0.81$ hypo 2</td>
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<td>Index Value $r = 0.69$ hypo 2</td>
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<td>FVC% predicted $r = 0.42$</td>
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<td>FEV1% predicted $r = 0.37$</td>
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<td>TCL% predicted $r = 0.37$</td>
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<td>TLCOc% predicted $r = 0.44$</td>
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<td>MRC-SF36 Vitality $r = -0.44$ hypo 2</td>
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<td>Tzanakis 2005</td>
<td>Adequate</td>
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<td>MRC- FEV1% rs= -0.39 = hypo 2</td>
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<td>De Jesus 2015</td>
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<td>MRC- 6MWD rs = -0.558 (n=7) = hypo 2</td>
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<td>Yorke 2011</td>
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<td>101 ILD</td>
<td>D12 -MRC; r 0.59 = hypo 1</td>
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<td>MRC-6MWD distance rs= -0.781 = hypo 2</td>
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<td>CPET (cardio-pulm. Exercise testing) = hypo 2</td>
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<td>MRC- Vo2 peak rs = -0.496</td>
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<td>MRC- VE/VCO2slope rs=0.731</td>
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<td>MRC- VE/VCO2 at AT rs 0.630</td>
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<td>MRC-BORGat peak exercise rs=0.5 = hypo 1</td>
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<td>Adequate</td>
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<td>MRC-OCD r = -0.53 = hypo 1</td>
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<td>23 ILD</td>
<td>Kim 2021 (10)</td>
<td>238 IPF</td>
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<td>MRC- BDI functional r = -0.61 = hypo 1</td>
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<td>MRC BDI effort r = -0.64 = hypo 1</td>
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<td>MRC-BDI focal r = -0.70 = hypo 1</td>
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<td>MRC-FVC r= -0.41 = hypo 2</td>
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<td>MRC-FEV1 r = -0.42 = hypo 2</td>
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<td>MRC-Plimax r = -0.38 = hypo 2</td>
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<td>MRC-PEmax r= -0.29 = hypo 2</td>
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<td>Silva 2021 (11)</td>
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<td>MRC-KBILD (total) rs= -0.63 = hypo 2</td>
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<td>MRC-UCSD rs 0.74 = hypo 1</td>
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<td>MRC-SGRQ (total) rs 0.68 = hypo 2</td>
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<td>MRC-SGRQ-I rs 0.67 = hypo 2</td>
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<td>MRC-HADS rs 0.49 = hypo2</td>
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<td>MRC- FVC%pred rs -0.35 = hypo 2</td>
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<td>MRC- 6MWD rs -0.38 = hypo 2</td>
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<td>MRC-EQ5D rs -0.60 = hypo 2</td>
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<td>Topcu 2021 (19)</td>
<td>25 CTD-ILD</td>
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<td>MRC- UCSDOBQ rs 0.56 = hypo 1</td>
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<td>NS</td>
<td>Baddini 2002 (14)</td>
<td>30IPF</td>
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<td>NS- SF36-Physical rs= -0.74 = hypo2</td>
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<td>NS- SF36- General health perception rs= -0.40 = hypo 2</td>
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<td>NS- SF36-Vitality rs= -0.60 = hypo 2</td>
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<td>NS- SF36-Social rs= -0.47 = hypo 3</td>
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<td>OCD- SF36- General health perception rs= -0.37 = hypo 2</td>
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<td>OCD- SF36-Vitality rs= -0.65 = hypo 2</td>
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<td>OCD- SF36-Social rs= -0.42 = hypo 3</td>
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<td>OCD- SF36-emotional rs= -0.41 = hypo 3</td>
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**Serious risk of bias; only 1 adequate study;**
**downgrading -1 level**
**Very serious risk of imprecision; sample 30pt,**
**downgrading -2 levels**
**Serious indirectness; -1 level; only correlations with related/unrelated constructs evaluated**
<table>
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<th>Study</th>
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<td>Tzanakis 2005 (5)</td>
<td>Adequate</td>
<td>OCD- FEV1% rs = 0.250 = hypo 2</td>
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<td>(25 IPF)</td>
<td>(convergent)</td>
<td>OCD- TLC% rs = 0.197 = hypo 2</td>
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<td>OCD-KCO% rs = 0.449 = hypo 2</td>
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<td>OCD-PaO2 (rest) rs = 0.736 = hypo 2</td>
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<td>OCD-PaO2(exercise) rs = 0.652 = hypo 2</td>
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<td>Mahler 1988 (18)</td>
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<td>23 ILD</td>
<td>(convergent)</td>
<td>OCD-BDI functional rs = 0.50 = hypo 1</td>
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<td>OCD BDI effort rs = 0.48 = hypo 1</td>
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<td>De Jesus 2015 (16)</td>
<td>Doubtful</td>
<td>OCD-FEV1L rs = 0.455 = hypo 2</td>
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<td>• Inconsistency; -1 level</td>
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<td>Doubtful</td>
<td>UCSD- FN-HAQ r = 0.58 = hypo 2</td>
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<td>(48 CTD-ILD)</td>
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<td>(180 IPF)</td>
<td>(convergent)</td>
<td>UCSD-DLCO rs = -0.20 = hypo2</td>
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<td>UCSD-6mWD rs = -0.39 = hypo 2</td>
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<td>UCSD-SGRQact rs=0.80 = hypo 2</td>
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<td>UCSD-SF36 PF rs -0.72= hypo 2</td>
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<td>D12 -UCSDOBQ r 0.4 = hypo 1</td>
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<td>Patients</td>
<td>Convergent Observations</td>
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<td>Chen 2021 (9)</td>
<td>2021</td>
<td>1933 fibrotic ILD</td>
<td><strong>very good</strong> (convergent)</td>
<td>UCSD - SGRQ $rs = 0.8291$ = hypo 2</td>
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<td>UCSD - EQ-5D-5L $rs = -0.7421$ = hypo 2 (health related QoL)</td>
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<td>UCSD - EQ-VAS $rs = -0.5939$ = hypo 2 (health related QoL)</td>
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<td>UCSD - FVC $rs = -0.4023$ = hypo 2</td>
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<td>UCSD - DLCO $rs = -0.4117$ = hypo 2</td>
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<td>UCSD - 6minWD $rs = -0.4827$ = hypo 2</td>
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<td>2021</td>
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<td>UCSD - SGRQ $rs = 0.822$ = hypo 2</td>
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<td>UCSD - FVC% pred $rs = -0.28$ = hypo 2</td>
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<td>UCSD 6mWD $rs = -0.34$ = hypo 2</td>
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<td>UCSD-MRC $rs = 0.74$ = hypo 1</td>
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<td>UCSD-KBILD (total) $rs = -0.74$ = hypo 2</td>
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<td>UCSD - HADS $rs = 0.60$ = hypo 2</td>
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<td>UCSD - EQ5D $rs = -0.78$ = hypo 2</td>
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<td>UCSD-MRC $rs = 0.56$ = hypo 1</td>
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<td>Bacci 2018 (5)</td>
<td>2018</td>
<td>168 IPF</td>
<td><strong>Adequate</strong> (convergent)</td>
<td>UCSD-OBQ-ERS Dyspnea $rs = 0.66$ = hypo 1</td>
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<td>VAS-D</td>
<td>Topcu 2021 (19)</td>
<td>N= 39 ILD</td>
<td><strong>Very good</strong> (convergent)</td>
<td>Vas-Breathing: FVC $rs = 0.941$ = hypo 2</td>
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<td>Vas-Breathing: DLco $rs = 0.818$ = hypo 2</td>
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**Responsiveness**

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<td>- imprecision -2 levels (&lt;50 patients included)</td>
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<td>ERS-IPF-B</td>
<td>Bacci 2018 (5) 168 IPF</td>
<td>Adequate</td>
<td>Responsiveness expressed as effect size, however no explicit hypothesis (and rationale) for the expected magnitude of the effect size is formulated.</td>
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<td>Moderate</td>
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<td>KBILD-B</td>
<td>Nolan 2019 (23) 209 ILD</td>
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<td>δKBILD-B-B (after 8 weeks revalidation)</td>
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<td>δMRC-DS r=-0.22 = hypo 1</td>
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<td>δISWT r=0.23 = shuttle walktest waarvan dyspneu onderdeel is, hypo 2</td>
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<td>δCRQ-D r=-0.35 = hypo 2</td>
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<td>Change VAS-D vs Change KBILD-B-B r=-0.51 = hypo 1</td>
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<td>Clinical progression used as gold standard non-IPF ILD AUC; 0.76 (&gt;0.70)</td>
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<td>IPF ILD AUC=0.81 (&gt;0.70)</td>
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<td>δMRC-DS - δKBILD-B-B-B r=-0.22 = hypo 1</td>
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<td>Clinical progression used as gold standard non-IPF ILD AUC; 0.76 (&gt;0.70)</td>
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<td>UCSD-SOBQ</td>
<td>Swigris 2012(20) 180 IPF</td>
<td>Doubtful (construct approach) removal of outliers without specification</td>
<td>Change UCSD vs several outcome measures expressed as estimate change and standard error. Baseline, 12 weeks and 24 weeks, no hypothesis defined by the review team</td>
<td>?</td>
<td>±</td>
<td>Moderate</td>
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<td>Chen 2021 (9) 1933 ILD</td>
<td>Inadequate (known groups) Statistical method inappropriate</td>
<td>Across the tertiles of change in UCSD-SOBQ, the mean change of each anchor was calculated to indicate the responsiveness” no correlations calculated, no hypothesis formulated by review team.</td>
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<td>Prior 2020 (25) 124 IPF</td>
<td>Very good (construct)</td>
<td>( \Delta \text{SOBQ- KBILD-B} r = -0.47 \approx \text{hypo 1} ) ( \Delta \text{SOBQ- \Delta SGRQ-I Total} 0.60 \approx \text{hypo 2} ) ( \Delta \text{SOBQ- \Delta SGRQ-I Symptoms} 0.39 \approx \text{-hypo 2} ) ( \Delta \text{SOBQ- \Delta SGRQ-I Activities} 0.44 \approx \text{hypo 2} ) ( \Delta \text{SOBQ- \Delta SGRQ-I Impacts} 0.53 \approx \text{hypo 2} )</td>
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| VAS-D | Yates 2018 (24) 64 ILD | Very good | Change VAS dyspnea vs Change KBILD-B \( r=0.51 \approx \text{hypo 1} \) Change VAS dyspnea vs Change FVC \( r=0.32 \approx \text{hypo 2} \) Change VAS dyspnea vs change DLCO% pred \( r=0.20 \approx \text{-hypo 2} \) Change VAS dyspnea vs change KBILDTot \( r=0.506 \approx \text{hypo 2} \) Change VAS vs Change 6MWD r \( r=0.37 \approx \text{hypo 2} \) | ± | ± | Moderate |

**Abbreviations:** ADL: Activities of Daily Living; BDI: Baseline dyspnea Index; BORG: Borg-dyspnea scale; CFi: Confirmatory Factor Analysis; CI: Confidence interval; CTD: connective tissue disease; CSQ: Chronic respiratory questionnaire; D12: Dyspnea 12 Questionnaire; DLCO: Diffusing capacity of the lung for carbon monoxide; ERS-IPF-B: EXACT-respiratory Symptoms IPF specific, Breathlessness subscale; EQ5D3L: Instrument of the EuroQol Group; five dimensions (mobility, self-care, usual activities, pain/discomfort and anxiety/depression Each dimension has 3 levels; FACIT-D: Functional Assessment of Chronic illness Therapy dyspnea- 10 item short form; FVC: Forced vital capacity; GRS: Global rating Score; HADS: Hospital Anxiety and depression Scale; HAQ: Health assessment questionnaire; ICC: Intraclass correlation coefficient; ILD: Interstitial lung disease; IPF: Idiopathic pulmonary fibrosis; KBILD-B: King’s Brief Interstitial Lung disease Health Status Questionnaire breathlessness and activities subscale; LoA: Limits of Agreement; MCID: Minimal clinical important difference; MLHF-PH: Minnesota living with heart failure-Pulmonary hypertension questionnaire; MRC: Medical Research Council Dyspnea score; NS: New Dyspnea Scale; O2C: Oxygen Cost Diagram; PaO2: Partial pressure of Oxygen; PAH: pulmonary arterial hypertension; PF-ILD: progressive Fibrosis- ILD; PH: Pulmonary hypertension: PROM: patient reported outcome; PROMIS-DS: Patient-Reported Outcomes Measurement Information System dyspnea severity short form; QoL: Quality of life; r: Pearson’s correlation; rs : Spearman’s correlation; SF-36: 36-item short form; SGRQ: Saint George Respiratory Questionnaire; SSc: systemic sclerosis; TDI: Transition dyspnea Index; TLCO Transfer factor of the lung for carbon monoxide; UCSD-SOBQ: University of California San Diego Shortness of Breath Questionnaire; VAS-D: Visual analog scale-Dyspnea; WHOFC: World health Organization functional classification; 6minWD: 6 minute walking distance.

**Symbols:** X: not applicable; * SHAQbVAS considered as VAS-dyspnea; +: sufficient; - :insufficient; ±: inconsistent; ?: indeterminate
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<tr>
<th>PROM</th>
<th>Internal Consistency</th>
<th>Reliability</th>
<th>Measurement Error</th>
<th>Construct Validity</th>
<th>Responsiveness</th>
<th>Recommendation</th>
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<td>+/- moderate</td>
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<td>+/- moderate</td>
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<td>A</td>
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<td>ERS-IPF-B</td>
<td>+/- high</td>
<td>+/- very low</td>
<td>x</td>
<td>+/- moderate</td>
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<td>KBILD-B</td>
<td>+/- high</td>
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<td>NS</td>
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<td>OCD</td>
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<td>PROMIS-DS</td>
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<td>UCSD-SOBQ</td>
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<td>VAS-D</td>
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**Table 3: Summary of pooled findings on the quality of evidence on measurement properties of included PROMS.**

Quality of evidence; categorized as High/moderate/low or very low.

**Abbreviations:** D12: Dyspnea 12 Questionnaire; ERS-IPF-B: EXACT-respiratory Symptoms IPF specific breathlessness subscale; FACIT-DS: Functional Assessment of Chronic Illness Therapy dyspnea-10 item short form; KBILD-B: King’s Brief Interstitial Lung disease Health Status Questionnaire breathlessness and activities subscale; MRC: Medical Research Council Dyspnea score; NS: New Dyspnea Scale; OCD: Oxygen Cost Diagram; PROM: patient reported outcome; PROMIS-DS: Patient-Reported Outcomes Measurement Information System dyspnea severity short form, UCSD-SOBQ: University of California San Diego Shortness of Breath Questionnaire; VAS-D: Visual analog scale-Dyspnea.

**Symbols:** overall rating of quality of measurement property

+ : sufficient; - : insufficient; ± : inconsistent ; ? indeterminate x; measurement property not evaluated in the included studies.