Title: Measurement properties of Patient Health Questionnaire-9 in adult patients with atopic dermatitis

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Abstract

**Background:** Atopic dermatitis (AD) patients commonly report depressive symptoms. However, few outcome measures have been validated for the purpose of assessing depressive symptoms in AD patients. Patient Health Questionnaire-9 (PHQ9) is an established patient-reported outcome measure that assesses depressive symptoms. Yet, little is known about the measurement properties of PHQ9 in AD patients.

**Objective:** To examine the measurement properties of PHQ9 and compare them with abridged PHQ2.

**Methods:** A prospective dermatology-practice based study of 579 AD patients (age 18-72 years).

**Results:** PHQ9 and PHQ2 were strongly correlated with each other (Spearman rho=0.81). PHQ9 had strong correlations with Patient-Reported Outcomes Measurement Information System (PROMIS™) Sleep-Related Impairment (SRI), but only weak-moderate correlations with Patient-Oriented Eczema Measure (POEM), Numeric Rating Scale (NRS) worst-itch and average-itch, Dermatology Life Quality Index (DLQI), ItchyQOL, PROMIS Sleep-Disturbance (SD), Eczema Area and Severity Index (EASI), Scoring AD (SCORAD), AD Severity Index (ADSI) and Body Surface Area (BSA). PHQ9 had significantly stronger correlations with POEM, PROMIS SD and PROMIS SRI than did PHQ2. PHQ9 and PHQ2 had fair discriminant validity. Changes from baseline in PHQ9 and PHQ2 were moderately correlated with each other, and weakly correlated with changes of the other outcome measures. There was no differential item functioning of PHQ items. There were floor effects but no ceiling effects for PHQ9 and PHQ2. PHQ9 showed good reliability (intraclass correlation coefficient range: 0.73-0.80), though PHQ2 had slightly better reliability (range: 0.77-0.88).

**Conclusion:** PHQ9 showed good construct and cross-cultural validity, reliability, responsiveness and feasibility in adults with AD. While PHQ2 was more feasible and slightly more reliable than PHQ9, it also had less construct validity. PHQ9 appears to be sufficiently valid for use in clinical practice and trials to assess depressive symptoms in AD.