

Comparing the visual analogue scale (VAS) and the numerical rating scale (NRS) in patient reported outcomes in psoriatic arthritis

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Background

The visual analogue scale (VAS), a 100mm horizontal line, is commonly used for many outcomes including pain in psoriatic arthritis (PsA). However, it can be susceptible to measurement error. The numerical rating scale (NRS), a 21-point scale, overcomes these limitations, however is not yet validated in PsA. We aimed to assess the agreement and reliability of the VAS and NRS scales in PsA.

Methods

Data was collected prospectively across three UK hospital trusts from 2018-2019. All patients completed VAS and NRS for pain, arthritis, psoriasis, and global disease activity. A subset were given an identical pack to complete one week later.

Mean with standard deviation (S.D.) was calculated and variability assessed using the Bland-Altman method. Intraclass correlation coefficients (ICC, two-way mixed model absolute agreement) was used to assess test-retest reliability. All analyses were performed using R. This study was approved by London-Surrey Research Ethics Committee.

Results

210 patients completed the study; one withdrew consent thus 209 were analysed. 62 patients completed the scales one week later. 60.0% were male, mean age was 51.7 years, and median PsA duration was 7.0 years. The mean (S.D.) scores are detailed in the table. For all 4 variables, the difference between the VAS and NRS scales mostly lie within 1.96 S.D. of the mean, as assessed using the Bland-Altman method, suggesting reasonable agreement between the two scales. The NRS is preferred by patients.

Comparing clinic and 1-week VAS scores, the ICCs for pain, psoriasis, arthritis and global disease activity were 0.91 (95% CI 0.84-0.94), 0.93 (0.87-0.96), 0.85 (0.74-0.91), 0.89 (0.81-0.93), respectively. For NRS, the ICCs

for pain, psoriasis, arthritis, and global disease activity were 0.93 (0.88-0.96), 0.89 (0.82-0.94), 0.91 (0.84-0.94), 0.91 (0.85-0.95), respectively. This suggests both scales have excellent test-retest reliability.

Conclusion

The VAS and NRS scales show reasonable agreement in patient reported pain, psoriasis, arthritis and global disease activity, and thus the NRS could be used to measure these outcomes in patients with PsA. Considering its lower likelihood of measurement error, faster speed to score, and better acceptability to patients, the NRS offers a feasible alternative to the VAS in clinical practice.

Word count: 350 (limit 350)

Table. Results of different variables using VAS and NRS scales in clinic and at home 1 week later.

	Clinic (n = 209)		Home (n = 62)	
Variable, mean (S.D.)	VAS	NRS	VAS	NRS
Pain	3.8 (3.1)	4.0 (3.1)	4.0 (3.1)	4.2 (3.2)
Psoriasis	3.3 (3.2)	3.6 (3.2)	3.6 (3.2)	3.6 (3.1)
Arthritis	4.0 (3.2)	4.1 (3.1)	4.0 (3.1)	4.1 (3.0)
Global disease activity	3.8 (3.1)	4.3 (3.1)	3.8 (3.1)	4.3 (3.0)
Preferred scale, n (%)	64 (30.6)	134 (64.1)	26 (41.9)	31 (50.0)