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Research Summary – Norton Pressure Ulcer Risk Scale – Skin Health

Author Year Research Design Setting (country)	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
[Salzberg et al.](#) 1999 Retrospective medical record review 5 trauma centers in the New York City area: Bronx Municipal Hospital Center (n=62) Lincoln Medical and Mental Health Centre (n=23) St. Vincent's Hospital and Medical Center (n=31) Our Lady of Mercy Medical Center (n=3)	N=226 (188M, 38F) Mean age 33.2±15.2yrs (range 1-83yrs) Acute, traumatic SCI patients admitted between June 1986 and October 1994 to one of five trauma centres in the New York area. Levels C4-S1.	**Spearman's correlation coefficient.** There were significant (P≤.001) correlations between the stage of the first pressure ulcer and all of the scales: Spinal Cord Injury Pressure Ulcer Scale – Acute (SCIPUS-A) (r=0.488), SCIPUS (r=0.343), Braden (r=-0.353), Gosnell (r=0.254), Abruzzese (r=0.241) and Norton (r=-0.192; P=.004). There were significant correlations between the number of ulcers developed and all of the scales: SCIPUS-A (r=0.519), SCIPUS		

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Westchester Medical Center (n=107)		(r=0.339), Braden (r=-0.431), Gosnell (r=0.297), Abruzzese (r=0.212) and Norton (r=-0.197; P=.003). Authors did not mention if the negative correlations were expected for Norton scale against stage of first pressure ulcer and number of ulcers developed. **This study focused on pressure ulcers that developed within the first 30 days post-admission. Pressure ulcers developing after this timeframe were not included. The SCIPUS-A (71%) was the most accurate in predicting pressure ulcer development,		

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		followed by the SCIPUS (65.9%), Braden (62.3%), Gosnell (62.2%), Abruzzese (60.1%) and Norton (60.8%) scales. The Norton scale had a sensitivity of 5.8% and a specificity of 95.6%.		
[Wellard & Lo](#) 2000 Retrospective medical history audit SCI unit	N=60 Mean age 43±18yrs (range 17-82yrs) Of the 60 cases examined, the pressure ulcer admission rate to the hospital was: 46.7% had 1 admission 18.3% had 2 admissions 16.7% had 3-4 admissions	*Histories indicated that Stirling's pressure ulcer severity scale was used for classification at time of admission. Descriptions in the patients' histories were used to retrospectively apply scores according to the Norton, Braden and Waterlow tools. Four histories had insufficient data, leaving N=56.*		**Floor/ceiling effect:** 86% of patients were at no risk 8% at risk 2% high risk **Interpretability: SEM, MDC, MCID, published & normative data:** Overall average Norton score (SD) for 60 patients: 15.4 (1.10), range 12-17

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	18.3% had >5 admissions Average (SD) length of stay in the hospital: 91 (98) days	**Spearman correlation coefficients.** When the scales were treated as continuous variables, there were significant correlations between the Stirling scores and both the Norton scores (r=-0.28; p=0.039) and the Waterlow scores (r=0.38; P=.004). When the scales were treated as categorical variables (e.g. at risk, high risk, very high risk), only the Waterlow scores were significantly correlated to the Stirling scores (r=0.32; P=.017).		

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		Assessing the correlations between the three retrospectively applied tools: The Norton scores were significantly correlated to both the Waterlow scores (r=-0.50 or 0.56*; P<.001) and the Braden scores (r=0.48 or 0.49*; P<.001). *Indicates discrepancy in the article text.		
Ash 2002 Retrospective medical history audit (used 3 point severity scale ulcers) may have included wounds not related to direct pressure (in	N=144 Mean age = 40 (range 10-89) All patients with a completed first admission to the SCI unit from 1998 to 2000 Average length from injury to discharge =	Pressure ulcers found to be significantly associated with length of stay, completeness of lesion (AIS score A versus BCDE), surgical stabilization of the neck, tracheostomy and delayed transfer to SCI unit. Completeness of lesion lends content support to the		**Interpretability: SEM, MDC, MCID, published & normative data:** Mean (range) Norton score (95% CI) and corresponding risk rating: All patients (n=144): 12.2 (11.9-12.5) --- particular/ at risk

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gluteal fold r/t fungus for example) SCI unit	152 days (95% CI 140–164, range 9–506)	Braden's inclusion of sensory perception, Surgical stabilization and tracheostomy may be related to mobility and activity limitations Waterloo: AUC = 76 CI (95%) 68-84 <u>Braden</u> AUC = 81 CI (95%) = 74-88 <u>Norton</u> AUC = 72 CI (95%) 64-81 <u>SCIPUS-A</u> AUC = 78 CI (95%) = 70-85		Patients w/ ulcers at any stage (n=80): 11.6 (11.2-12) --- particular Patients w/ no ulcers at any stage (n=64): 13.1 (12.6-13.6) --- at risk Risk rating (Norton et al. 1962): 14 or less = at risk 12 or less = particular risk