Reviewer ID: Tyra Chu, Carlos L. Cano Herrera

Last updated: January 23rd, 2024

Research Summary – The Braden Scale – Skin Health

Author Year Country Research Design Setting	Demographics and Injury Characteristics of Sample	Validity	Reliability	Responsiveness Interpretability
Flett et al. 2019 Retrospective cohort Tertiary rehabilitation centre in Montreal and Toronto	N=754 (510M, 244F) Mean age (SD): 53.9 (18.5) Traumatic SCI 40%; Non-traumatic 60% Tetraplegic 43%; 50% Paraplegic; 7% unknown Complete injury 15%; Incomplete 77%; unknown 8% 424 Pressure injuries in 241 individuals (32.0%) Injury duration (SD): 84.6 (378.4) days Length of stay (SD): 68.4 (41.3) days Inclusion criteria:	Analysis of Braden Scale: Cutoff ≤16 AUC 0.73 Sensitivity: 0.82 Specificity: 0.59 Positive Predictive Value: 0.35 Negative Predictive Value: 0.93 False Negative (%): 2.9 Likelihood Ratio: 2.02 Logistic regression analysis demonstrated significant relationships between Braden Scale and pressure injury incidence. Braden Scale AUC = 0.73		Compared to those who did not develop PIs, individuals with PI incidence had significantly lower Braden scores (15.0 vs. 17.6, P<0.01). Study findings suggest that a simple measure of mobility, admission FIM bed/chair transfer score of 1 (total assist), can identify at-risk individuals with greater accuracy than both an SCI specific instrument (SCIPUS) and a PI specific instrument (Braden)

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	Length of stay >3 days	The Braden Scale's **friction and shear item** had AUCs ≥0.70 and negative predictive value ≥0.95.		
Ash 2002 Retrospective medical history audit (used 3 point severity scale ulcers) may have included wounds not related to direct pressure (in gluteal fold r/t fungus for example) SCI unit	N=144 Mean age = 40 (range 10-89) All patients with a completed first admission to the SCI unit from 1998 to 2000 Mean (95%CI) time since SCI at admission to spinal unit: 14(1-17) days	Pressure ulcers found to be significantly associated with length of stay, completeness of lesion (AIS A versus BCDE), surgical stabilization of the neck, tracheostomy and delayed transfer to SCI unit. Completeness of lesion lends content support to the Braden's inclusion of sensory perception, Surgical stabilization and tracheostomy may be related to mobility and activity limitations		Mean (range) Braden score (95% CI) and corresponding risk rating: based on (Bergstrom et al. 1987): 23-18 = no risk; 17-13 = low risk; 12-9 = medium risk; 8 = high risk All patients (n=144): 11.1 (10.7-11.5) --- medium Patients w/ ulcers at any stage (n=80): 9.9 (9.6-10.3) --- medium Patients w/ no ulcers at any stage (n=64): 12.6 (12-13.2) --- medium/low

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		Waterloo: Area Under Curve (AUC) = 76 CI (95%) 68-84 Braden AUC = 81 CI (95%) = 74-88 Norton AUC = 72 CI (95%) 64-81 SCIPUS-A AUC = 78 CI (95%) = 70-85		
Salzberg et al. 1999 Retrospective medical record review 5 trauma centers in the New York City area: Bronx Municipal	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.	Braden Scale: It was found that sensory perception, mobility and nutritional variables were not significantly related to pressure ulcer development. Moisture was the most important predictive variable. Factors that needed accounting for were extent of paralysis and		

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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) Westchester Medical Center (n=107)		levels of serum creatine and albumin. **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		

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		(r=0.519), SCIPUS (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 Norton scale was predicted to have a negative correlation with the stage of the first pressure scale and with the 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 Braden scale was more accurate in		

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		predicting pressure ulcer development (62.3%) than the Gosnell (62.2%), Abruzzese (60.1%) or Norton (60.8%) scale, but less accurate than the SCIPUS-A (71%) or SCIPUS (65.9%) scores. Using the standard cut-off point of ≤18, the sensitivity was 100%, but the specificity was only 4.4%. The best balance was found with a cut-off point of ≤10, which gave a sensitivity of 74.7% and a specificity of 56.6%.		
Wellard & Lo 2000 Retrospective medical history audit	N=60 Mean age 43±18yrs (range 17-82yrs) Of the 60 cases examined, the pressure ulcer	Descriptions in the patients' histories were used to retrospectively apply scores according to Stirling's pressure ulcer severity scale, and the Norton,		Mean (SD) Braden score for 60 patients: 13.8 (1.75), range 10-18 4% of patients – no risk 29% of patients – low risk

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SCI unit	admission rate to the hospital was: 46.7% had 1 admission 18.3% had 2 admissions 16.7% had 3-4 admissions 18.3% had >5 admissions Average (SD) length of stay in the hospital: 91 (98) days	Braden and Waterlow tools. Four histories had insufficient data, leaving N=56. **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=.039) and the Waterlow scores (r=0.38; P=.004), but not the Braden scores (r=0.03; P=.813). When the scales were treated as categorical variables (e.g. at risk, high risk, very high risk):		46% of patients – moderate risk 21% of patients – high risk

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		Only the Waterlow scores were significantly correlated to the Stirling scores (r=0.32; P=.017). (Norton, r=0.14, P=.311; Braden, r=-0.08, P=.569.) 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.		