



Using the Braden Scale to Predict Patient’s Risk of Developing Pressure Ulcers in the Acute Care Setting

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Background

A pressure ulcer is defined as a localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear and/or friction. It is well-recognized that pressure ulcers are a significant cause of morbidity and lead to lower quality of life for both the patients and their carers. The first measure in prevention is risk assessment. In Singapore General Hospital (SGH), the Braden Scale for Pressure Ulcer Risk (Table 1) is used to assess patients’ risk, given that it has the strongest published reliability and acceptable sensitivity and reliability. While the Braden Scale is the most commonly used tool, research on the predictability of the cumulative Braden Scale score and its sub scales scores is lacking in the local population. Moreover, there is a lack of evidence on what should be the cut-off score for the local patients.

Table 1: Braden Scale for Pressure Ulcer Risk

| Braden Scale | | | | |
|--|-----------------------|-----------------------|-----------------------|--------------------|
| Risk Factors | Score/Description | | | |
| Sensory Perception | 1 Completely Limited | 2 Very Limited | 3 Slightly Limited | 4 No Impairment |
| Moisture | 1 Constantly Moist | 2 Often Moist | 3 Occasionally Moist | 4 Rarely Moist |
| Activity | 1 Bedfast | 2 Chair fast | 3 walks Occasionally | 4 Walks Frequently |
| Mobility | 1 Completely Immobile | 2 Very Limited | 3 Slightly Limited | 4 No Limitations |
| Nutrition | 1 Very Poor | 2 Probably Inadequate | 3 Adequate | 4 Excellent |
| Friction and Shear | 1 Problem | 2 Potential Problem | 3 No apparent problem | |
| Severe Risk : Total score <9 High Risk: Total Score 10-12 Moderate Risk: Total Score 13-14 Mild Risk 15-18 | | | | |
| Ref: Braden B (2001) Protocols by level of risk. Available at: http://www.bradenscale.com/images/protocols_by_level_of_risk.pdf . Accessed on 25 June 2014. | | | | |

Aim

This study aimed to evaluate the predictive validity of the Braden Scale in a local acute care tertiary hospital

Methods

A methodological study was conducted, using the database from a study evaluating the effectiveness of a liaison nurse and care algorithm on the prevention and management of pressure ulcers. In the original study, data were collected over a 6 months period after implementation of the liaison nurse and care algorithm (July-Dec 2012); in 6 acute wards in SGH. All patients were assessed using the Braden Scale upon admission and followed up till discharge to evaluate for any development of nosocomial pressure ulcers.

Conclusion

Study demonstrated that the Braden scale does help to predict the development of pressure ulcers among our local patients. However, the specificity of the scale is low at the recommended cut-off of 19. This could result in the inefficient use of limited resources.

Results

Data from 1021 patients were available for analysis. Forty-eight patients developed ulcers (incidence rate of 4.7%).

As illustrated in Table 2, the mean total score in patients with pressure ulcer was significantly different from those whom did not have pressure ulcers (14.3 vs. 17.5, p< 0.001).

Table 2: Comparison of Total and Sub-scale Scores between Patients who developed Pressure Ulcers and Those who did not

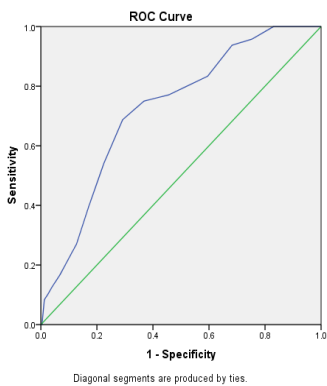
| | Patients who developed pressure ulcers Mean (SD) | Patients who did not developed pressure ulcers Mean (SD) | T test (p-value) | Effect Size (eta squared) |
|--------------------|---|---|------------------|---------------------------|
| Total Score | 14.3 (3.5) | 17.5 (3.8) | 5.6 (0.0) | 0.03 |
| Sensory Perception | 2.9 (0.9) | 3.3 (0.7) | 3.7 (0.0) | 0.01 |
| Moisture | 2.8 (0.8) | 3.1 (0.8) | 2.8(0.0) | 0.01 |
| Activity | 1.9 (0.9) | 2.8 (1.0) | 5.4 (0.0) | 0.03 |
| Mobility | 2.2 (0.6) | 2.9 (0.8) | 6.0 (0.0) | 0.03 |
| Nutrition | 2.4 (0.7) | 2.9 (0.7) | 4.4 (0.0) | 0.02 |
| Friction and Shear | 2.1 (0.6) | 2.5 (0.6) | 4.5 (0.0) | 0.02 |

Compared with patients who were ulcer-free, patients who developed ulcers had significantly lower scores for all the subscales. Direct logistic regression was also performed on all the risk factors. The full model (with all risk factors) was statistically significant, X^2 (6, n=1021)=38, p=0.00. However, only ‘mobility’ made a unique statistically significant contribution to the model (Table 3), with an odds ratio of 0.4.

Table 3: Logistic Regression Predicting Likelihood of Developing Pressure Ulcer

| | B | SE | Wald | p | Odds Ratio | 95% CI for Odds Ratio (upper , lower) |
|--------------------|-------|------|-------|------|------------|--|
| Sensory Perception | .102 | .265 | .147 | .702 | 1.107 | .658 , 1.862 |
| Moisture | .300 | .265 | 1.283 | .257 | 1.350 | .803 , 2.269 |
| Activity | -.266 | .238 | 1.246 | .264 | .766 | .480, 1.223 |
| Mobility | -.862 | .309 | 7.765 | .005 | .423 | .231, 0.774 |
| Nutrition | -.374 | .269 | 1.942 | .164 | .688 | .406, 1.164 |
| Friction and Shear | .003 | .319 | .000 | .992 | 1.003 | .537, 1.876 |
| Constant | -.419 | .695 | .363 | .547 | .658 | |

For our cohort, a cut-off of 18.5-19.5 resulted in sensitivity of 0.8-0.9 and specificity of 0.3-0.4, with an AUC of 0.7



| Area | Std. Error ^a | Asymptotic Sig. ^b | Asymptotic 95% Confidence Interval | |
|------|-------------------------|------------------------------|------------------------------------|-------------|
| | | | Lower Bound | Upper Bound |
| | | | .658 | .790 |

| Positive if Less Than or Equal To ^a | Sensitivity | 1 - Specificity |
|---|-------------|-----------------|
| 5.00 | .000 | .000 |
| 6.50 | .000 | .004 |
| 7.50 | .042 | .008 |
| 8.50 | .083 | .012 |
| 9.50 | .104 | .027 |
| 10.50 | .125 | .039 |
| 11.50 | .167 | .068 |
| 12.50 | .271 | .127 |
| 13.50 | .396 | .171 |
| 14.50 | .542 | .225 |
| 15.50 | .688 | .292 |
| 16.50 | .750 | .368 |
| 17.50 | .771 | .456 |
| 18.50 | .833 | .595 |
| 19.50 | .938 | .682 |
| 20.50 | .958 | .754 |
| 21.50 | 1.000 | .830 |
| 22.50 | 1.000 | .894 |
| 24.00 | 1.000 | 1.000 |