Interrater Reliability of the Braden and Braden Q by Skin Champion Nurses☆,☆☆

Nicole Riccioni *, Rosa Berlanga, Joseph Hagan, Robin Schier [1], Mary Gordon

Texas Children's Hospital, Houston, TX, USA

A B S T R A C T

The interrater reliability of the Braden Q skin risk assessment scale has never been reported. The purpose of the study was to assess the interrater reliability among pediatric Skin Champion (SC) nurses with the use of the Braden and Braden Q scales. The pilot study included 16 paired SC nurses. Each pair of nurses attempted to assess 8 patients using the Braden and Braden Q scales. However, patient care requirements at the time of the study assessments limited the number slightly. The actual number of assessments with the Braden scale was $n = 52$ and the Braden Q was $n = 63$. The Intra-class Correlation Coefficient (ICC) for the Braden scale was 0.894, 95% confidence interval (CI) (0.823, 0.938), which is excellent agreement. The ICC for the Braden Q was 0.726, 95% CI (0.585, 0.824), which is fair to good agreement. Among the six subcategories on the Braden scale, mobility and activity had higher agreement scores among the SC nurses. Among the seven subcategories on the Braden Q scale, mobility and sensory perception had higher agreement scores. Nutrition and friction/shear subcategories on both scales had the lowest agreement scores. Subcategories with the lowest agreement usually have the greatest measurement error. Possible sources of error include unclear definitions of scoring criteria, different clinical data pulled from different locations in the chart. Error can be reduced by clarifying the subcategory definitions and standardizing the data used for the assessment and the location of each data point in the EMR. A high interrater agreement is the goal because it provides confidence that the scale is used reliably to identify high risk patients who require additional care to prevent harmful events.

Introduction

Pressure injury prevention continues to be a hot topic in pediatric hospitals around the country. The American Nurses Association considers pressure injury to be a Nursing-Sensitive Indicator because the occurrence and outcome are most affected by nursing care (Montalvo, 2007). Pressure injury rates are reported to benchmarking and accreditation agencies routinely as a quality metric of quantity or quality of nursing care (Montalvo, 2007).

In 2008, the federal Centers for Medicare and Medicaid Services announced they would no longer reimburse hospitals for treatment of hospital-acquired pressure injury in Medicare patients. Under this new payment plan, pressure injuries will qualify for reimbursement only if the presence of Stage III or IV ulcers are noted in the medical record within two days of patient admission. Pressure injuries identified after day two are not eligible for additional reimbursement (Centers for Medicare & Medicaid Services, 2008). These rules also extend to Medicaid recipients, including pediatric patients, as of July 2012. Private insurers have also adopted these reimbursement restrictions (Mattie & Webster, 2008). The change shifts the responsibility of pressure injury prevention to health care organizations and can place a large financial burden on health care systems, thereby incentivizing pressure ulcer prevention.

Pressure Injury Risk Assessment Scales

A key recommendation for pressure injury prevention is to use a valid and reliable risk assessment scale (Noonan, Quigley, & Curley, 2011). The two risk assessment scales used at Texas Children's

Hospital are the Braden and Braden Q. The Braden Scale was developed to identify patients, nine years of age and older, who are at risk for developing pressure injuries (Bergstrom, Braden, Laguzza, & Holman, 1987). The Braden Scale consists of six subscales that reflect sensory perception, skin moisture, activity level, mobility, nutritional status and the skin's exposure to friction and shear forces (Bergstrom et al., 1987). The Braden Q was developed for pressure injury risk identification in children aged 21 days to 8 years (Quigley & Curley, 1996). The Braden Q contains the original six subscales of the Braden scale but adds a seventh subscale for tissue oxygenation and perfusion (Curley, Quigley, & Lin, 2003; Quigley & Curley, 1996).

The use of an assessment score alerts the nurse to 'higher risk' cases in need of more aggressive pressure relief interventions (Tume, Siner, Scott, & Lane, 2013). Knowing the total risk score and the subscale scores help nurses determine the appropriate intervention to mitigate the identified risk (Ayello & Braden, 2002). Pressure injury risk assessment is a routine nursing practice and standard of care. Regarding predictive validity, the Braden Scale has demonstrated sensitivities that range from 38% to 100% and specificities ranging from 58% to 92%, with a cut off score of 16–18 (Bergstrom et al., 1987; Curley, Razmus, Roberts, & Wypij, 2003; Tume et al., 2013).

Reliability is the degree to which random measurement error is absent from data (Polit & Beck, 2012). Interrater reliability is a specific type of reliability that refers to the amount of error among different raters/observers rating the same object or person (Polit & Beck, 2012). Interrater reliability is quantified as a percentage of agreement score (Siedlecki & Albert, 2017). This is important to know because it represents a composite of multiple raters (Skin Champion nurses) rather than the result of one person's judgement, which adds to the generalizability of the study.

Several studies have examined the interrater reliability of the Braden scale. All of these studies have produced similar intraclass correlation coefficients (ICC) for total Braden scale sum scores (Ho et al., 2016; Kottner & Dassen, 2008; Kottner & Dassen, 2010; Kottner, Halfens, & Dassen, 2009). In addition, the majority of these studies have reported that the greatest amount of measurement error have been found among the individual Braden subscale items of sensory perception and nutrition (Kottner et al., 2009; Kottner & Dassen, 2008; Kottner & Dassen, 2010). Other studies have found moisture, activity and friction shear to have the largest amount of measurement error (Ho et al., 2016; Kottner et al., 2009; Kottner & Dassen, 2010).

In 2008, Kottner and Dassen conducted an interrater reliability study in two German nursing homes. Residents from 8 units were assessed twice (Kottner & Dassen, 2008). The raters were trained nurses (Kottner & Dassen, 2008). Differences between nurses rating the overall Braden score ranged from 0 up to 9 points (Kottner & Dassen, 2008). Interrater reliability expressed by the ICC ranged from 0.73 (95% Confidence Interval [CI] 0.26–0.91) to 0.95 (95% CI 0.87–0.98) (Kottner & Dassen, 2008). Calculated ICC for individual items ranged from 0.06 (95% CI -0.31-0.48) to 0.97 (95% CI 0.93-0.99), with the lowest values being measured for the items "sensory perception" and "nutrition" (Kottner & Dassen, 2008).

In 2009, Kottner, Halfens and Dassen published the results of an interrater reliability study of the assessment of pressure ulcer risk using the Braden scale and the classification of pressure ulcers in a home care setting. Duplicate assessments by trained nurses were performed during two nationwide pressure ulcer prevalence surveys in 2007 and 2008 in the Netherlands (Kottner et al., 2009). Intraclass Correlation Coefficients for the Braden scale sum scores were 0.90 (95% CI 0.88–0.92) and 0.88 (95% CI 0.85–0.91), respectively (Kottner et al., 2009). The items "moisture," "sensory perception" and "nutrition" exhibited the largest amounts of measurement error (Kottner et al., 2009).

In 2010, Kottner and Dassen conducted interrater reliability studies on two adult intensive care units (ICUs) at a large University Hospital in Germany. A sample of three trained nurses independently assessed patients (Kottner & Dassen, 2010). They found the interrater reliability of Braden scale sum scores was ICC 0.72 (95% CI 0.52–0.87) and 0.84 (95% CI 0.72–0.92) (Kottner & Dassen, 2010). The items "activity" on unit one and "sensory perception" on unit two exhibited the largest amounts of measurement error (Kottner & Dassen, 2010).

In 2016, Ho, et al., published the results of a mixed methods study examining interrater reliability and nurse perception of the usability of the Braden scale in an adult tertiary acute care setting in Canada. The raters consisted of nurses and research staff that independently assessed patients at baseline and after 72 h (Ho et al., 2016). They found the interrater reliability of Braden scale sum scores was ICC 0.807 (95% CI 0.704–0.875) with the greatest amount of measurement error for the item "friction shear" (ICC 0.266 (95% CI -0.081-0.502)) (Ho et al., 2016). Nurses reported that "friction shear" was the most difficult item to rate due to the subjective wording of the description of the item subscore and a disassociation between descriptions and titles (Ho et al., 2016).

Although the interrater reliability of the Braden scale has been studied extensively, no studies have examined the interrater reliability of the Braden Q scale.

Routines of Care

Routine assessment of risk for pressure injury at Texas Children's Hospital includes age-appropriate skin risk assessment completed on every patient upon admission, upon receipt of transfer from another unit, post-surgery, and during every shift (12 h) by the nurse. The scales generate a total risk score that identifies patients who are at risk of developing pressure injury. Prevention interventions are then performed to support prevention goals. Risk scores are entered into the electronic medical record and prevention interventions are documented in the daily plan of care.

Skin Champion Program

Texas Children's Hospital (TCH) reports monthly hospital-acquired pressure injury (HAPI) rates per 1000 patient days. The reportable pressure injuries include Stage 3, 4, and Unstageable. During FY 2013, the HAPI rates ranged from 0.01 to 0.50 per 1000 patient days. The total number of reportable pressure injuries in FY 2013 was 51. A hospital-wide Pressure Injury Task Force was created to reduce the incidence of HAPI. The goal for fiscal year 2014 was to decrease the number of reportable pressure ulcers to less than or equal to 41.

The Skin Champion Program was launched in December 2013 as a key driver of the Pressure Injury Task Force. The goals of the Skin Champion program were to empower front line staff to implement evidence-based care bundles in six high-risk units, achieve consistency of practice and provide resource availability at the point of care. Staff nurses and Patient Care Assistants (PCAs) were recruited from units with a high incidence of pressure injuries (Pediatric Intensive Care Unit, Cardiovascular Intensive Care Unit, Progressive Care Unit, Neurology Unit, the Rehabilitation Unit and the Epilepsy Monitoring Unit). There are 3–7 Skin Champion Registered Nurses and PCAs from every high-risk area, with representation on both day and night shifts.

The Skin Champion program supports professional development through educational offerings. Skin Champions attend an initial 4-hour introductory course, Principles of Skin Care and Pressure Injury Prevention, which includes an overview of risk assessment and prevention interventions. In addition, Skin Champions attend monthly meetings where unit-specific and house-wide pressure

injury data are reviewed and other skin care topics are presented. Additional in-depth training was provided on each subcategory of the Braden and Braden Q in a series of eight Skin Champion monthly meetings.

The Skin Champions raise awareness of pressure injury prevention during weekly patient care rounds as they engage other staff nurses, patients and families in discussions about prevention interventions. They also audit charts for documentation of pressure injury prevention bundle compliance. In addition, the nursing leadership agreed to purchase the Wound Treatment Associate course from the Wound Ostomy Care Nursing Society, and 10 Skin Champion nurses were enrolled in the course per month until all Skin Champions were enrolled.

Purpose of Study

The purpose of this research study was to evaluate the interrater reliability of the Braden and Braden Q risk-assessment scales among pediatric Skin Champion nurses.

Methods/Procedure

This study was completed at Texas Children's Hospital, a large quaternary care pediatric hospital in Houston, Texas. The study involved 16 Skin Champion nurses from high-risk areas in the hospital (Pediatric Intensive Care Unit, Cardiovascular Intensive Care Unit, Progressive Care Unit, Neurology Acute Care unit, Epilepsy Monitoring Unit and Rehabilitation Unit).

Skin Champions were recruited for the study during a monthly Skin Champion meeting. Four data collection dates were chosen over a one month period. The Skin Champion nurses self-selected one of the scheduled dates to participate in the study.

On each of the scheduled dates of data collection, the co-investigators explained the purpose, provided a description of the study, answered questions regarding data collection and obtained signed consents from the participants. Skin Champions were paired and given a data collection score sheet. Each nurse was asked to individually assess eight patients using the Braden and eight patients using the Braden Q scales. The paired nurses physically entered the patients' rooms together, introduced themselves to patient/parent and explained the purpose of their visit. Some scale components require direct visualization of the patient and other categories were examined in the electronic medical record (EMR). EMR information was retrieved on separate computers. The scoring by each pair was completed independently and simultaneously without sharing of information. Co-investigators were nearby to ensure none of the data were shared.

The patient selection on the high-risk units rotated, either starting at bed one and proceeding to the next bed until eight patients in each age category were selected, or by starting with the last bed and proceeding backward until all eight patients in each age category were selected. Patient selection was based solely on patient age. However, on a few occasions, the Skin Champions were not able to complete the assigned 16 risk assessments due to patient care needs at the time, resulting in a total of 115 patients having a completed risk assessment (13 patients could not be assessed). Missing data were excluded from the analysis. Only complete Braden and Braden Q scores were analyzed to assess interrater reliability.

Statistical Methods

Interrater reliability of the Skin Champions' Braden and Braden Q skin risk-assessment scores was assessed using the ICC. Because the same pair of raters did not assess every patient, the version of the ICC that was used is the ICC (1,1), which is based on a one-way random

effects Analysis of Variance (ANOVA) model that treats the raters as being randomly selected from a larger population of all raters (Shrout, 1979). Fleiss, Levin, and Paik (2003) provide the following guidelines for interpreting the magnitude of the value of the ICC as a measure of agreement:

Value of ICC	Interpretation
>0.75	Excellent
0.40–0.75	Fair to good
<0.40	Poor

The Weighted Kappa coefficient (Cohen, 1968) was used to assess agreement between individual items of the Braden and Braden Q. Although this method is considered to be a conservative measure of agreement (i.e., it tends to underestimate the extent of agreement), Weighted Kappa has the advantage of being appropriate for ordinal data and adjusting for agreement expected due to chance. Observed values of the Weighted Kappa coefficient can be interpreted according to the guidelines provided by Landis and Koch (1977) with a coefficient <0 indicating "no agreement", 0–0.20 "slight agreement", 0.21–0.40 "fair agreement", 0.41–0.60 "moderate agreement", 0.61–0.80 "substantial agreement", and 0.81–1 as "almost perfect agreement". The ICC and Weighted Kappa coefficients were computed using the "irr" package in R version 3.2.4 for Windows (R Foundation for Statistical Computing, Vienna, Austria). An *a priori* power analysis indicated that the anticipated 60 patients would provide precision on the ICC 95% confidence intervals of ±0.15 to ±0.03 for true ICCs of 0.65 to 0.95, respectively.

Results

The 16 Skin Champion nurses were female and the majority (56%) was staff nurses (Table 2). Half of the Skin Champions had a Bachelor of Science in Nursing and half were certified in their specialty (Table 2). A total of 115 patients were assessed by the Skin Champion nurses. Eight pairs of nurses completed Braden assessment scores for a total of 52 patients (Table 1). The Intraclass Correlation Coefficient for the Braden scale was 0.894 (95% CI: 0.823–0.938), which represents "Excellent" agreement (Fleiss et al., 2003). The Weighted Kappa coefficients for the Braden items ranged from 0.415 to 0.921 (Table 3).

Eight pairs of nurses completed Braden Q assessment scores for a total of 63 patients (Table 1). The ICC for the Braden Q scale was 0.726 (95% CI: 0.585–0.824), which represents "Fair to Good" agreement (Fleiss et al., 2003). The Weighted Kappa coefficients for the Braden Q items ranged from 0.429 to 0.699 (Table 3).

Table 1
The number of patients assessed by the Braden and Braden Q for each rater pair.

Rater pair	Number of patients assessed	
	Braden	Braden Q
1	8	7
2	6	8
3	6	8
4	6	8
5	5	8
6	6	8
7	7	8
8	8	8
Total	52	63

Table 2
Demographic characteristics of the 16 Skin Champions.

Characteristic	n (%)
Gender	
Female	16 (100%)
Education	
Associates Degree in Nursing	3 (19%)
Bachelor of Science in Nursing	8 (50%)
Master of Science in Nursing	4 (25%)
Other	1 (6%)
Position	
Staff nurse	9 (56%)
Charge nurse	3 (19%)
Other	4 (25%)
Unit	
Neurology unit	1 (6%)
Acute Care	1 (6%)
CVICU	5 (31%)
Inpatient rehabilitation	2 (13%)
PCU	4 (25%)
PICU	3 (19%)
Certified in specialty area	
Yes	8 (50%)
No	5 (31%)
Not reported	3 (19%)
Characteristic	Mean (SD)
Age (years)	39.5 (11.7)
Years employed at institution	8.6 (8.9)
Years employed as a nurse	13.3 (10.8)
Years as skin champion	1.1 (1.1)

Discussion

The Skin Champion nurses' interrater reliability was higher with the Braden scale than with the Braden Q scale. The subcategories on the Braden with the highest agreement were mobility and activity. The subcategories with the lowest agreement were nutrition and friction shear. The Braden findings are similar to what has been previously reported in the literature (Kottner & Dassen, 2008, 2010; Kottner et al., 2009; Magnan & Maklebust, 2009; Ho et al., 2016).

The Braden Q subcategories with the highest agreement were mobility and sensory perception. The subcategories with the lowest agreement were nutrition and friction shear, which are the same lower scoring items as on the Braden scale. The subcategories with the lowest

Table 3
Weighted Kappa coefficients for the Braden and Braden Q items.

Braden item	Weighted Kappa coefficient	Interpretation of agreement[a]
Sensory perception	0.695	Substantial
Mobility	0.784	Substantial
Activity	0.921	Almost perfect
Moisture	0.614	Substantial
Nutrition	0.415	Moderate
Friction shear	0.544	Moderate

Braden Q item	Weighted Kappa coefficient	Interpretation of agreement[a]
Sensory perception	0.694	Substantial
Mobility	0.699	Substantial
Activity	0.634	Substantial
Moisture	0.594	Moderate
Nutrition	0.500	Moderate
Friction Shear	0.429	Moderate
Tissue perfusion/oxygenation	0.621	Substantial

[a] (Landis & Koch, 1977).

agreement have the greatest measurement error. Thus, to improve the agreement scores, it is important to identify the source of error or inconsistency. One possible source of error is vague or unclear definitions of the subcategories and scoring criteria. The descriptors of the nutrition and friction shear scoring categories on both scales are very subjective, compared to other categories. (Appendices A & B, Braden and Braden Q Scales; Braden & Bergstrom, 1988; Curely et al., 2003; Ho et al., 2016). Definitions and measurement criteria should be crystal clear with objective operational definitions provided to minimize the influence of individual interpretations. Another possible reason for the scoring inconsistency is not knowing where the nurses find the clinical data to make the scoring decisions. Clarification for the location of the 'source of truth' would help standardize the process and reduce variability. Clarifying the definitions and establishing the location for the source of truth will minimize error. Providing annual/biannual training programs to review the scales, criteria and scoring definitions, and location of the 'source of truth' may minimize variability among the nurses and facilitate improved interrater reliability.

Nursing Implications

Valid and reliable risk assessment scales are used by nurses in clinical settings to quantify the patients' risk of encountering quality and safety events. The scores are used to identify patients who are at risk for a harmful event and need prevention interventions to reduce the risk that the harmful event will occur. The accuracy of scores depends on nurses' knowledge of each risk assessment subcategory and their ability to minimize measurement error. As shown in this study, there is currently a substantial amount of variability among Skin Champion nurses when using the Braden and Braden Q scales. Annual nurse skill training programs should include refresher courses of risk assessment scales to minimize nurse to nurse variability and ensure high interrater reliability.

Interrater reliability should be evaluated annually to check agreement of risk assessment scoring. A high agreement score provides confidence that the scale is used consistently by nurses to identify high-risk patients who require additional care to prevent harmful events. Lower agreement scores are associated with vagueness and ambiguity about the subcategory items, which identifies the need for targeted education to clarify specific definitions, criteria for scoring and location of the information.

Limitations and Future Study

This study may be limited due to the small number of Skin Champion nurses who participated in the research.

Future research to find similarities/differences in agreement scores between clinical staff who work in high risk pressure injury areas and Skin Champion nurses would provide added insight for targeted educational activities. Also, it would be interesting to see the variability of scores between and among the high risk for pressure injury units included in this study.

Selection and implementation of a valid and reliable risk assessment tool is made in good faith by researchers after reviewing the psychometrics of the tool. Comparing differences and similarities in the new setting and population with the original setting and population may necessitate a follow-up validity study to demonstrate accuracy of the scale in the new environment. More reliability and validity studies would help us understand the accuracy, consistency and usefulness of many risk assessment tools used today.

Declarations of interest

None.

Appendix A

BRADEN SCALE – For Predicting Pressure Sore Risk

SEVERE RISK: Total score ≤ 9 **HIGH RISK**: Total score 10-12 **MODERATE RISK**: Total score 13-14 **MILD RISK**: Total score 15-18				**DATE OF ASSESS ➡**
RISK FACTOR	**SCORE/DESCRIPTION**			
SENSORY PERCEPTION Ability to respond meaningfully to pressure-related discomfort	**1. COMPLETELY LIMITED** – Unresponsive (does not moan, flinch, or grasp) to painful stimuli, due to diminished level of consciousness or sedation, **OR** limited ability to feel pain over most of body surface.	**2. VERY LIMITED** – Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness, **OR** has a sensory impairment which limits the ability to feel pain or discomfort over ½ of body.	**3. SLIGHTLY LIMITED** – Responds to verbal commands but cannot always communicate discomfort or need to be turned, **OR** has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 extremities.	**4. NO IMPAIRMENT** – Responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort.
MOISTURE Degree to which skin is exposed to moisture	**1. CONSTANTLY MOIST** – Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time patient is moved or turned.	**2. OFTEN MOIST** – Skin is often but not always moist. Linen must be changed at least once a shift.	**3. OCCASIONALLY MOIST** – Skin is occasionally moist, requiring an extra linen change approximately once a day.	**4. RARELY MOIST** – Skin is usually dry; linen only requires changing at routine intervals.
ACTIVITY Degree of physical activity	**1. BEDFAST** – Confined to bed.	**2. CHAIRFAST** – Ability to walk severely limited or nonexistent. Cannot bear own weight and/or must be assisted into chair or wheelchair.	**3. WALKS OCCASIONALLY** – Walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.	**4. WALKS FREQUENTLY** – Walks outside the room at least twice a day and inside room at least once every 2 hours during waking hours.
MOBILITY Ability to change and control body position	**1. COMPLETELY IMMOBILE** – Does not make even slight changes in body or extremity position without assistance.	**2. VERY LIMITED** – Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.	**3. SLIGHTLY LIMITED** – Makes frequent though slight changes in body or extremity position independently.	**4. NO LIMITATIONS** – Makes major and frequent changes in position without assistance.
NUTRITION Usual food intake pattern [1]NPO: Nothing by mouth. [2]IV: Intravenously. [3]TPN: Total parenteral nutrition.	**1. VERY POOR** – Never eats a complete meal. Rarely eats more than 1/3 of any food offered. Eats 2 servings or less of protein (meat or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement, **OR** is NPO[1] and/or maintained on clear liquids or IV[2] for more than 5 days.	**2. PROBABLY INADEQUATE** – Rarely eats a complete meal and generally eats only about ½ of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement **OR** receives less than optimum amount of liquid diet or tube feeding.	**3. ADEQUATE** – Eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products) each day. Occasionally refuses a meal, but will usually take a supplement if offered, **OR** is on a tube feeding or TPN[3] regimen, which probably meets most of nutritional needs.	**4. EXCELLENT** – Eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.
FRICTION AND SHEAR	**1. PROBLEM** – Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures, or agitation leads to almost constant friction.	**2. POTENTIAL PROBLEM** – Moves feebly or requires minimum assistance. During a move, skin probably slides to some extent against sheets, chair, restraints, or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.	**3. NO APPARENT PROBLEM** – Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair at all times.	

https://www.in.gov/isdh/files/Braden_Scale.pdf

Appendix B

The Braden Q Scale					
Intensity and Duration of Pressure					Score
Mobility The ability to change and control body position	**1. Completely immobile:** Does not make even slight changes in body or extremity position without assistance.	**2. Very Limited:** Makes occasional slight changes in body or extremity position but unable to completely turn self independently.	**3. Slightly Limited:** Makes frequent though slight changes in body or extremity position independently.	**4. No Limitations:** Makes major and frequent changes in position without assistance.	
Activity The degree of physical activity	**1. Bedfast:** Confined to bed	**2. Chair fast:** Ability to walk severely limited or nonexistent. Cannot bear own weight and/or must be assisted in to chair or wheelchair.	**3. Walks Occasionally:** Walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.	**4. All patients too young to ambulate OR walks frequently:** Walks outside the room at least twice a day and inside room at least once every 2 hours during waking hours.	
Sensory Perception The ability to respond in a developmentally appropriate way to pressure-related discomfort	**1. Completely Limited:** Unresponsive (does not moan, flinch, or grasp) to painful stimuli, due to diminished level of consciousness or sedation OR limited ability to feel pain over most of body surface.	**2. Very Limited:** Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness OR has sensory impairment which limits the ability to feel pain or discomfort over ½ of body.	**3. Slightly Limited:** Responds to verbal commands, but cannot always communicate discomfort or need to be turned OR has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 extremities.	**4. No Impairment:** Responds to verbal commands. Has no sensory deficit, which limits ability to feel or communicate pain or discomfort.	
Tolerance of the Skin and Supporting Structure					
Moisture Degree to which skin is exposed to moisture	**1. Constantly Moist:** Skin is kept moist almost constantly by perspiration, urine, drainage, etc. Dampness is detected every time patient is moved or turned.	**2. Very Moist:** Skin is often, but not always moist. Linen must be changed at least every 8 hours.	**3. Occasionally Moist:** Skin is occasionally moist, requiring linen change every 12 hours.	**4. Rarely Moist:** Skin is usually dry, routine diaper changes, linen only requires changing every 24 hours.	
Friction - Shear *Friction:* occurs when skin moves against support surfaces *Shear:* occurs when skin and adjacent bony surface slide across one another	**1. Significant Problem:** Spasticity, contracture, itching or agitation leads to almost constant thrashing and friction.	**2. Problem:** Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance.	**3. Potential Problem:** Moves feebly or requires minimum assistance. During a move skin probably slides to some extent against sheets, chair, restraints, or other devices. Maintains relative good position in chair or bed most of the time but occasionally slides down.	**4. No Apparent Problem:** Able to completely lift patient during a position change; Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair at all times.	
Nutrition *Usual* food intake pattern	**1. Very Poor:** NPO and/or maintained on clear liquids, or IVs for more than 5 days OR Albumin <2.5 mg/dl OR Never eats a complete meal. Rarely eats more than ½ of any food offered. Protein intake includes only 2 servings of meat or dairy products per day. Takes fluids poorly. Does not take a liquid dietary supplement.	**2. Inadequate:** Is on liquid diet or tube feedings/TPN which provide inadequate calories and minerals for age OR Albumin <3 mg/dl OR rarely eats a complete meal and generally eats only about ½ of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement.	**3. Adequate:** Is on tube feedings or TPN, which provide adequate calories and minerals for age OR eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products) each day. Occasionally will refuse a meal, but will usually take a supplement if offered.	**4. Excellent:** Is on a normal diet providing adequate calories for age. For example: eats/drinks most of every meal/feeding. Never refuses a meal. Usually eats a total of 4 or more servings of meat and diary products. Occasionally eats between meals. Does not require supplementation.	
Tissue Perfusion and Oxygenation	**1. Extremely Compromised:** Hypotensive (MAP <50mmHg; <40 in a newborn) OR the patient does not physiologically tolerate position changes.	**2. Compromised:** Normotensive; Oxygen saturation may be <95 % OR hemoglobin may be < 10 mg/dl OR capillary refill may be > 2 seconds; Serum pH is < 7.40.	**3. Adequate:** Normotensive; Oxygen saturation may be <95 % OR hemoglobin may be < 10 mg/dl OR capillary refill may be > 2 seconds; Serum pH is normal.	**4. Excellent:** Normotensive, Oxygen saturation >95%; Normal Hemoglobin ; & Capillary refill < 2 seconds.	
				Total:	

From Curley, M.A.Q., Razmus, I.S., Roberts, K.E., Wypij, D. Predicting Pressure Ulcer Risk in Pediatric Patients: The Braden Q Scale. Nursing Research. 52(1):22–33, January/February 2003.

References

Ayello, E., & Braden, B. (2002). How and why to do pressure ulcer risk assessment. *Advances in Skin & Wound Care, 15*(3), 125–131 (quiz 132-133).

Bergstrom, N., Braden, B., Laguzza, A., & Holman, V. (1987). The Braden scale for predicting pressure sore risk. *Nursing Research, 36*(4), 205–210.

Braden, B., & Bergstrom, N. (1988). Braden scale - For predicting pressure sore risk. https://www.in.gov/isdh/files/Braden_Scale.pdf (Retrived from).

Centers for Medicare & Medicaid Services (2008). *Medicare and medicaid move aggressively to encourage greater patient safety in hospitals and reduce never events. 2013.* https://www.cms.gov/Newsroom/MediaReleaseDatabase/Press-releases/2008-Press-releases-items/2008-07-313.html?DLPage=1&DLFilter=hospita&DLSort=0&DLSortDir=descending (from).

Cohen, J. (1968). Weighed kappa: Nominal scale agreement with provision for scaled disagreement or partial credit. *Psychological Bulletin, 70*(4), 213–220. https://doi.org/10.1037/h0026256.

Curley, M., Quigley, S., & Lin, M. (2003). Pressure ulcers in pediatric intensive care: Incidence and associated factors. *Pediatric Critical Care Medicine, 4*(3), 284–290. https://doi.org/10.1097/01.PCC.0000075559.55920.36.

Curley, M., Razmus, I., Roberts, K., & Wypij, D. (2003). Predicting pressure ulcers in pediatric patients: The Braden Q scale. *Nursing Research, 52*(1), 22–33.

Fleiss, J. L., Levin, B., & Paik, M. C. (2003). *Statistical methods for rates and proportions* (3rd ed.). Hoboken, NJ: John Wiley & Sons.

Ho, C., Cheung, A., Southern, D., Ocampo, W., Kaufman, J., Hogan, D., ... Ghali, W. (2016). A mixed methods study to assess interrater reliability and nurse preception of the Braden in a teriary acute care setting. *Ostomy/Wound Management, 62*(12), 30–38.

Kottner, J., & Dassen, T. (2008). An interrater reliability study of the Braden scale in two nursing homes. *International Journal of Nursing Studies, 45*(10), 1501–1511. https://doi.org/10.1016/j.ijnurstu.2008.02.007.

Kottner, J., & Dassen, T. (2010). Pressure ulcer risk assessment in critical care: Interrater reliability and validity studies of the Braden and Waterlow scales and subjective ratings in two intensive care units. *International Journal of Nursing Studies, 47*(6), 671–677. https://doi.org/10.1016/j.ijnurstu.2009.11.005.

Kottner, J., Halfens, R., & Dassen, T. (2009). An interrater reliability study of the assessment of pressure ulcer risk using the Braden scale and the classification of pressure ulcers in a home care setting. *International Journal of Nursing Studies, 46*(10), 1307–1312. https://doi.org/10.1016/j.ijnurstu.2009.03.014.

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics, 33*(1), 159–174.

Magnan, M. A., & Maklebust, J. (2009). The effect of web-based braden scale training on the reliability of braden subscale ratings. *Journal of Wound, Ostomy, & Continence Nursing, 36*(1), 51–59.

Mattie, A., & Webster, B. (2008). Centers for Medicare and Medicaid Services' "never events": An analysis and recommendations to hospitals. *The Health Care Manager, 27*(4), 338–349. https://doi.org/10.1097/HCM.0b013e31818c8037.

Montalvo, I. (2007). The National Database of nursing quality indicators (NDNQI). *OJIN: The Online Journal of Issues in Nursing, 12*(3). https://doi.org/10.3912/OJIN.Vol12No03Man02.

Noonan, C., Quigley, S., & Curley, M. (2011). Using the Braden Q scale to predict pressure ulcer risk in pediatric patients. *Journal of Pediatric Nursing, 26*(6), 566–575. https://doi.org/10.1016/j.pedn.2010.07.006.

Polit, D., & Beck, C. (2012). In H. Surrena (Ed.), *Nursing research: Generating and assessing evidence for nursing practice* (9th ed.). Wolters Kluwer, Lippincott Williams & Wilkins.

Quigley, S., & Curley, M. (1996). Skin integrity in the pediatric population: Preventing and managing pressure ulcers. *Journal of the Society of Pediatric Nurses, 1*(1), 7–18.

Shrout, P. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin, 86*(2), 420–428.

Siedlecki, S. L., & Albert, N. M. (2017). Understanding interrater reliability and validity of risk assessment tools used to predict adverse clinical events. *Clinical Nurse Specialist, 31*(1), 23–29. https://doi.org/10.1097/NUR.0000000000000260.

Tume, L., Siner, S., Scott, E., & Lane, S. (2013). The prognostic ability of early Braden Q scores in critically ill children. *Nursing in Critical Care, 19*(2), 98–103. https://doi.org/10.1111/nicc.12035.