ORIGINAL ARTICLE

Development of a Measure of Skin Care Belief Scales for Persons With Spinal Cord Injury

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ABSTRACT. King RB, Champion VL, Chen D, Gittler MS, Heinemann AW, Bode RK, Semik P. Development of a measure of Skin Care Belief Scales for persons with spinal cord injury. Arch Phys Med Rehabil 2012;93:1814-21.

Objectives: To develop and validate a measure of skin care beliefs and to describe the skin care behaviors of persons with spinal cord injury (SCI).

Design: A mixed-methods design was used to develop the Skin Care Beliefs Scales (SCBS). The health belief model framed the hypotheses. Phase 1 included item development, content validity testing, and pilot testing. Phase 2 included testing the scale structure (principal components analysis), internal consistency reliability, test-retest reliability, and relationships between the belief scales and care behaviors.

Setting: Two acute rehabilitation hospitals and Internet websites.

Participants: Patients with SCI (N=462; qualitative/pilot n=56; psychometric study n=406) participated.

Interventions: Not applicable.

Main Outcome Measures: The pilot and phase 2 studies, respectively, used 146-item and 114-item versions of the SCBS. A skin care activity log was used to record skin care behaviors.

Results: Content validity indicated that the items were relevant and clear. The analysis resulted in 11 independent scales reflecting 3 general beliefs (susceptibility, severity, self-efficacy) and barrier and benefit behavior-specific scales for skin checks, wheelchair pressure reliefs, and turning and sitting times. With the exception of skin check barriers (α=.65), Cronbach alphas of the scale ranged from .74 to .94. Test-retest intraclass correlations were fair to excellent (range, .42–.75). Construct validity was supported. Hierarchical linear regression indicated that turning benefits, barriers, susceptibility, and self-efficacy were significant predictors of turning time. Benefits or barriers were correlated significantly with skin check and pressure relief adherence (ρ range, −.17 to −.33). Self-efficacy was correlated with wheelchair pressure relief (ρ=.18). Skin care behavior adherence varied widely (eg, 0%–100%).

Conclusions: The scales showed acceptable reliability and validity. Further testing with larger samples is desirable.

Key Words: Pressure ulcer; Psychometrics; Rehabilitation; Self care; Spinal cord injuries.

PRESSURE ULCERS are a common complication after spinal cord injury (SCI), accounting for a high percentage of rehospitalizations.[1] Most articles on pressure ulcers in community samples of persons with SCI indicate incidence or prevalence rates of 30% or higher.[2-4] Individuals with SCI are taught preventive skin care behaviors but often perform them inconsistently, particularly after discharge to the community.[3,5-8] Adherence to a skin care regimen requires integration of new habits into one's lifestyle, presenting a challenge to clinicians to promote behavior change.[9]

Given that the knowledge of preventive care is insufficient to prevent pressure ulcers, it is essential to explore strategies to promote prevention behaviors. The health belief model[10] has been used to predict adherence to self-care regimens in chronic conditions.[11-14] The model proposes that adherence to a health regimen is motivated by beliefs about susceptibility and severity of the condition, the benefit of the behavior to achieve the desired outcome, barriers to performing the behavior, and self-efficacy to perform the behavior.[15] Belief instruments specific to behaviors are stronger predictors than general instruments.[12]

Dai and Catanzaro[16] found significant relationships between pressure ulcer prevention beliefs and care behaviors in 20 Taiwanese outpatients with paraplegia. A limitation of this study was the use of a general measure of self-care. Other investigators reported that belief in susceptibility to pressure ulcers predicted ulcer development 1 year later.[3] These studies used single items to assess beliefs and excluded women. Findings from a study of skin care behaviors in persons with SCI indicated that subjects with positive health beliefs, such as the need for vigilance, were more likely to prioritize skin care than those who did not believe vigilance was important.[6]

Although a measure of self-efficacy for skin care has been created,[17] scales specific to beliefs and behaviors do not exist. Such measures have potential to promote skin care adherence. Therefore, the major purpose of the current study was to develop a reliable and valid instrument to measure pressure ulcer prevention health beliefs in persons with SCI. The hypotheses were the following: (1.1) each scale derived from the health belief model will be unidimensional and minimally

List of Abbreviations

SCI	spinal cord injury

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correlated with other scales (statistical construct validity); (1.2) internal consistency reliability coefficients for the health belief scales will be at least .70 and test-retest coefficients will support stability; and (1.3) the combined health belief scales will predict adherence to skin checks, wheelchair pressure relief activity, wheelchair sitting time, and turning time (theoretical construct validity). The second purpose was to describe the skin care beliefs of persons with SCI and their skin care behaviors.

METHODS

Design

This exploratory, 2-phase, instrument development study used qualitative and quantitative methods at 2 freestanding rehabilitation hospitals. Phase 1, instrument development, included (1) a qualitative study to aid item development, (2) item development, (3) content validity, and (4) pilot testing. Phase 2 consisted of psychometric testing to assess scale construct validity and reliability.

Participants

Individuals with SCI comprised the sample of 462, 56 of whom participated in either the qualitative component[6] or the pilot study in phase 1, and 406 of whom participated in phase 2. Eligibility criteria were (1) age of 18 years or older, (2) motor and/or sensory deficit requiring preventive skin care, (3) English speaking, and (4) access to a telephone. Persons with intact sensation who did not use a wheelchair were ineligible.

The projects were approved by the institutional review boards at both sites. Recruitment methods included approaching outpatients and inpatients for consent and screening, advertising in publications and consumer websites, and posting flyers. Informed consent was obtained in person for inpatients and outpatients, and by mail for those responding to advertisements.

Instruments

Skin care belief scales. We wrote 146 items based on the health belief model literature[17,18] and findings from the qualitative study.[6,7] The items included generic belief concepts (severity, susceptibility, and self-efficacy) and behavior-specific items for the barriers and benefits. Self-efficacy items included the concept that caregivers may be responsible for some care behaviors. All items used a Likert-type, 5-point response scale (strongly disagree, disagree, neutral, agree, and strongly agree). Higher values indicated greater agreement with the belief. The health belief concepts are defined below[19]:

1. Susceptibility reflects risk for developing a pressure ulcer when care is not performed.
2. Severity includes beliefs about the physical, social, and psychological consequences of not preventing a pressure ulcer.
3. Benefit is the belief that skin care will prevent pressure ulcers.
4. Barriers include perceptions of the cost or negative aspects of completing skin care.
5. Self-efficacy is the belief that the individual or a caregiver has the ability to perform preventive activities.

Background and illness form. The form was developed to collect demographic and illness characteristics. Data were retrieved from the medical record, when possible, and verified through interview. Participants were screened for sensation and motor ability. We classified SCI as complete or incomplete based on sensation and motor activity.[20]

Skin care activity log. The log was developed to record self-report behaviors in 30-minute increments during pilot testing and phase 2. Four skin care behaviors were assessed. Percent adherence to skin check and wheelchair pressure relief, respectively, were the number of daily skin inspections and wheelchair pressure reliefs completed every 30 minutes, divided by the number of skin checks and wheelchair pressure reliefs, respectively, that should have been performed for the days with data. These values were multiplied by 100 to compute percent adherence. We also calculated the longest time sitting without a wheelchair pressure relief. We assessed the longest time sitting without transferring out of the wheelchair and the average time without turning, because standards do not exist to calculate adherence for these behaviors. A log was completed at baseline and 4 days each week during 2 consecutive weeks. With the exception of inpatients, data were collected by telephone. Research assistants called participants weekly to record log data. Participants received a $25 stipend.

Statistical Analysis

Cronbach alphas were computed to assess internal consistency reliability for all scales in both study phases. Item analysis included deleting items with item-total correlations below .30 and examining the alpha with the item deleted. After these revisions, the alpha coefficient for each scale was recomputed.

We assessed the structure of the health belief scale using a series of factor procedures with principal components analysis and varimax rotation.[21] We anticipated that 5 factors, representing the 5 belief constructs, would be identified for each behavior. Criteria for extraction included loadings of at least .40 and at least .15 difference in cross-loadings. Items that loaded .40 or greater on more than 1 scale were eliminated. Initial review was guided by use of the scree plot to identify the number of components and by defining components as important if they had eigenvalues greater than 1.0. Principal components analyses were computed serially by entering the barrier and benefit scales for each behavior with the severity, susceptibility, and self-efficacy scales. When low component loadings occurred, 1 item was deleted and the analysis repeated until all items loaded according to the entry criteria.

Because of nonnormal distributions of some scales and skin care behaviors, Spearman correlation coefficients were computed to assess the relationship between beliefs and skin check, wheelchair pressure relief, and sitting time. Hierarchical multiple regression was used to predict average turning time. A logarithmic transformation achieved normative distribution for severity, which was entered in the hierarchical regression analysis. Intraclass correlation coefficients, using the original values, including those with nonnormal distributions were computed to assess test-retest reliabilities.[22] Descriptive statistics described care behaviors and demographic/illness variables.

RESULTS

Phase 1: Health Belief Scale Development and Content Validity

Readability of the health belief scale items was grade level 5.9 using the SMOG method. (The SMOG uses the number of polysyllabic words in 10-sentence clusters to determine reading level, which is converted to a grade level.)[23] We evaluated content validity with a 10-member panel composed of 2 individuals with SCI, 4 nurse experts in the health belief model, and 4 nurses experienced in SCI nursing; 3 judges were experienced in instrument development. The panel members rated relevance and clarity of the items using the index of content