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Original Article

Validating the Functional Pain Scale for Hospitalized Adults

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ABSTRACT

Background: Enhancing pain patient's ability to function and cope is important, but assessing only intensity ignores those aspects of pain. The Functional Pain Scale (FPS), addresses these dimensions but lacked validation in hospitalized adults with chronic pain.

Aims: This research was conducted to establish the FPS psychometric properties in hospitalized adults.

Design: A prospective pilot study examined the reliability and validity of the FPS in two acute care hospitals.

Settings: Adult inpatients from medical/surgical units at two hospitals.

Participants/Subjects: A convenience sample of 93 subjects from an Academic Medical Center and 51 from a tertiary care hospital who were 21–81 years old and primarily Caucasian.

Methods: Hospitalized adults with chronic pain at two facilities provided pain scores from the FPS, Numeric Rating Scale, Pain, Enjoyment of Life, and General Activities Scale, and Quality of Pain Care Scale. Test-retest reliability and construct validity were evaluated using standard correlation methods.

Results: Hospitalized adults aged 21–88 years with chronic pain (N = 144) were evaluated. Data supported test-retest reliability of the FPS ($r = .84$; $p < .001$), which had strong, statistically significant correlations with the Numeric Rating Scale at different study sites ($r = 0.75$ and $r = 0.45$, respectively), indicating acceptable construct validity. Significant weak correlations between the FPS and other measures of mood and functioning failed to support discriminant validity.

Conclusions: Although statistically significant, the reliability and validity of FPS were not as strong in hospitalized chronic pain patients as reported for older adults in other settings.

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Improved functioning and pain tolerability are important, especially for chronic pain patients. Hospitals commonly use the Numeric Rating Scale (NRS), which ignores these aspects of pain. The Functional Pain Scale (FPS) addresses these dimensions but lacks validation in hospitalized adults. The purpose of this study was to evaluate the psychometric properties of the FPS by conducting reliability and validity testing. The FPS was compared with

other brief pain assessment tools in a population of hospitalized adults (e.g., NRS) and those with chronic pain (e.g., Pain, Enjoyment of Life, and General Activities [PEG] Scale).

This study examined the reliability and validity of the FPS in two acute care hospitals. Hospitalized adults with chronic pain were assessed using the FPS, NRS, and PEG scales and Revised American Pain Society Patient Outcome Questionnaire (APS-POQ-R). Test-retest reliability, concurrent validity, and stated tool preferences were evaluated at two hospitals.

Hospitalized adults aged 21–88 years with chronic pain (N = 144) provided data supporting test-retest reliability of the FPS ($r = 0.84$; $p < .001$). Moderate to strong correlations of the FPS with the NRS at two study sites indicated acceptable convergent validity. Significant weak correlations between the FPS and measures of mood or functioning provided limited support its ability to discriminate pain from these different but related phenomenon.

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Reliability and validity of the FPS were not as strong in hospitalized chronic pain patients as reported in prior validation studies, nor in a setting new to its use. By including questions about pain tolerability and impact on functioning, the clinical utility of the FPS in the hospital setting is promising. Testing of a refined version for hospital use is suggested.

Background

Problem

Widely accepted definitions describe pain as an unpleasant physical and emotional phenomenon, best understood from the perspective of the person experiencing it. These definitions address the subjective, multidimensional nature of pain, which makes it unique to the person, contextual, and challenging to assess (Twycross, Voepel-Lewis, Vincent, Franck, & von Baeyer, 2016). Beyond standard multidimensional approaches to conduct initial and periodic comprehensive assessments, a brief, easily administered tool that is sensitive to changes in a patient's pain experience over time is needed. The NRS is a commonly used assessment tool that meets these criteria (Ferreira-Valente, Pais-Ribeiro, & Jensen, 2011; Paice & Cohen, 1997). Although self-reported pain intensity measurements have been called the most "clinically relevant dimension of the pain experience regardless of disease" (Hjermstad et al., 2011, p. 1086), focusing on pain intensity alone oversimplifies the biopsychosocial experience (Pasero, Quinlan-Colwell, Rae, Broglio, & Drew, 2016; Schiavenato & Craig, 2010), especially in persons with chronic pain, few of whom achieve sustained pain reduction. Assessing improved functioning, quality of life, and avoidance of harm may be more realistic therapeutic priorities (Dowell, Haegerich, & Chou, 2016).

Significance

Given an estimated prevalence of 100 million Americans living with chronic pain (lasting >3 months) in 2011, it is increasingly encountered among hospitalized patients [Institute of Medicine (IOM), 2011]. Current standards of care in hospitals require the use of pain assessment tools that are understandable and consistent with the patient's age, abilities, and condition [The Joint Commission (TJC), 2017]. The chronic pain condition challenges professionals to reconsider how they assess and care for these patients. Reassessments should use pain reduction, functional improvement, and harm avoidance as measures of treatment response (Dowell et al., 2016; The Joint Commission (TJC), 2017).

The subjective nature of pain makes it challenging to assess because patients may underreport or deny the presence of pain, in part because of the way pain is stigmatized in our society (Cagle & Bunting, 2017). Some patients may overreport their pain out of anxiety, fear of pain, an overly pessimistic outlook, or reward-seeking motivation (Biagianti, Grazzi, Usai, & Gambini, 2014; Logan & Rose, 2005; Pinto, McIntyre, Araújo-Soares, Costa, & Almeida, 2015).

The imperative to assess and need to treat or refer those with high pain intensity may have unintentionally contributed to potentially harmful opioid prescribing practices (Christie et al., 2017). Assessment using a functional scale may broaden the focus to include the extent pain interferes with physical and psychosocial functioning as a measure of chronic pain and treatment effectiveness.

The Pain Management Nursing Scope and Standards of Practice (American Nurses Association, 2016) identifies the FPS as a valid tool that could be used in different populations, including "teens and adults" (p. 81), for different pain types and settings. The FPS

was developed to measure pain intensity based on its tolerability and interference with functioning among adults older than age 65 in geriatric inpatient, ambulatory, and in-home hospice settings (Gloth, Scheve, Stober, Chow, & Prosser, 2001). This tool was added as an option to assess inpatient adults (young and old) by the first author as part of a quality improvement project in 2006. Feedback from patients and nurses supported its utility, especially for patients with chronic pain. Yet formal testing of the tool's psychometric properties in hospitalized adults has not been published.

Purpose

The purpose of this study was to evaluate the psychometrics of the FPS compared with other brief pain assessment tools used for hospitalized adults or persons with chronic pain.

Literature Review

Numeric Rating Scale

The NRS measures pain using an 11-point scale, where 0 represents "no pain" and 10 represent the "worst possible pain." These anchors are inherently flawed because they have no basis in shared experiences (Jurecic, 2018). This problem is compounded if the professional asks for a rating on a 1-10 scale because the anchor "1" has no common base of reference. The 0 representing "no pain" is more concrete, although biopsychosocial, experiential, and cultural differences among patients allow room for variable interpretation of the threshold when a discomfort transitions to be perceived as painful. The anchor of "10" representing the "worst pain" is similarly influenced by a host of factors including contextual aspects of the experience. A brief assessment method that considers the subjective impact on physical and psychosocial functioning could better account for these factors and guide therapy better than measures of pain intensity alone (Pasero et al., 2016). Despite its flaws, the NRS is the most common pain assessment tool used in acute hospital settings. A recent study, however, found as many as 40% of patients admitted to the hospital with moderate or severe pain had chronic pain, and the NRS was not as sensitive to improvements for patients with chronic pain than those patients admitted with acute pain (Deng et al., 2018).

When pain is chronic, multidimensional scales provide insight into the complex, interrelated sensory-discriminative (physical), affective-motivational (psychosocial), and interpretive (cognitive) components of the experience. The McGill Pain Questionnaire and the BPI are standard tools used by researchers to evaluate these domains (Dworkin et al., 2005). These tools are too burdensome (10- to 30-minute assessment time) for clinical use in acute care environments.

Functional Pain Scale

The FPS may be preferable for evaluating chronic pain in acute hospital settings. It was originally developed to assess pain in older adults who had difficulty using the NRS to accurately self-report pain intensity (Gloth, 2010; Gloth et al., 2001; Pautex et al., 2006) and includes a patient-reported rating of pain's perceived tolerability and interference with functioning (Gloth et al., 2001). Permission was granted for general use in a variety of clinical settings (Gloth et al., 2001). The FPS has been used clinically for several years by the first author after discussing with Dr. Gloth (personal communication, September 14, 2006) how to adjust scoring to a 0-10 scale, aligned with other hospital pain tools (Table 1).

The clinical use of this tool in the hospital setting was subsequently rated highly by patients and nurses as part of a quality

Table 1
Functional Pain Scale Scoring for Study

Score	FPS Scoring as Used	Suggested FPS for Hospital Use
0	No pain	No pain
2	Tolerable: Does not prevent from doing usual activities	Tolerable: Able to perform <i>all</i> permitted activities
4	Tolerable: Able to do some but not all usual activities	Intolerable: Able to perform <i>most</i> permitted activities
5		Tolerable: pain that becomes intolerable with movement and limits the ability to perform prescribed physical activities (e.g., out of room ambulation, or physical therapy)
6	Intolerable: Interferes with most active but not passive activities*	Intolerable: Unable to perform prescribed activities requiring physical exertion. Passive activities* unaffected by pain
8	Intolerable: Interferes with all active and most passive activities*	Intolerable: Unable to perform prescribed activities requiring physical exertion, and passive activities* are limited by pain
10	Intolerable: Can't do any activity (even speak) because of pain	Intolerable: <i>Unable to do anything</i> or even speak because of pain and exhibits constant pain behaviors (grimacing, moaning, etc.)

* Active activities include walking and activities of daily living. Passive activities include reading, watching TV, and talking on the phone.

improvement activity. Its use has facilitated the planning and evaluation of pain treatment, particularly for hospitalized patients with chronic pain. A report was generated from this site's electronic record to examine its frequency of use 10 years after being introduced, and it was the second most commonly used self-report measure (among five choices) behind the NRS.

PEG Subscale of the Brief Pain Inventory

The PEG is a three-item tool that asks, on a 0–10 scale, for a rating of pain, enjoyment of life, and interference with general activity experienced over the past week. These three scores are then averaged. This subscale is recommended to briefly measure chronic pain in primary care settings (Dowell et al., 2016). It helps distinguish common chronic pain (experienced most days for ≥ 6 months) from “high-impact chronic pain,” which produces “substantial restriction of participation in work, social, and self-care activities for six months or more” (U.S. Department of Health and Human Services, 2016, p. 12). This scale has never been validated in a hospital setting, but a 30% reduction in both pain and functioning are deemed a treatment success for patients with chronic pain (Dowell et al., 2016). The FPS may be better suited to evaluate pain and treatment response of hospitalized adults' chronic pain because it is a measure of pain intensity that addresses the extent pain interferes with functioning.

Research Question

How does the psychometric properties of the FPS compare with other brief pain assessment tools used for hospitalized adults or persons with chronic pain?

Methods

Design

This study used a cross-sectional design to assess the psychometric properties of the FPS in acute care settings. A convenience sample of adult inpatients were recruited in 2016 to 2017 from medical and surgical units at two hospitals.

Sample

The population included English-speaking inpatients, at least 18 years old, with self-reported chronic pain lasting more than 3 months, who were identified by institution-specific reports designed to identify patients with uncontrolled pain. Patients who were cognitively impaired, had a mental illness diagnosed by psychiatry, or were unable to read, write, or speak English well enough to provide verbal consent or understand the questions

asked were excluded. At Study Site 2, those who lacked the manual dexterity to complete a written tool were also excluded. The timing of medications before or after the data collection period was not known to the data collectors and did not factor into either the inclusion or exclusion criteria.

Setting Descriptions

Study Site 1 included four general care units at a 1,034-bed academic medical center in the Northeastern United States where the FPS has been used for more than 10 years. Study Site 2 included two medical or surgical units at a 167-bed Midwestern tertiary care hospital where the FPS had not been previously introduced for independent validity testing.

Procedures for both settings used a similar cross-sectional approach for recruitment and data collection. The FPS was administered along with two other pain scales. Basic demographic characteristics were collected to describe the sample. The procedures were submitted separately to each institution's respective Institutional Review Boards and were approved using the same tools as described next.

At Study Site 1, potential participants were identified by an electronic health record–derived report of pain intensity that identified patients with three or more pain intensity readings ≥ 5 out of 10 in the prior 24 hours. For those who met the inclusion criteria, the assigned nurse provided verbal consent for researchers to approach the patient for recruitment. This is common at the research-intensive academic medical center and was deemed a more secure way of protecting patients' personal information than allowing the investigators to extract medical records data. It also ensured that the study did not interfere with medically necessary procedures or nurse workflow. The study was only conducted on units where the nursing director agreed that the registered nurses (RNs) providing direct patient care could be approached in this manner.

A “Study Information Summary” was given to each potential participant after confirming the inclusion criteria (e.g., age, English comprehension, having chronic pain) were met. Once potential participants indicated they understood the summary content and their questions were answered, they were offered the opportunity to participate. A signed consent was waived because it would be the sole identifier connecting the participant to the study. A verbal consent was obtained as recommended by the Institutional Review Board to protect patients' personal information. Because the FPS was already a standard practice at this facility, it was classified as a minimal risk study with the requirement for signed consent waived.

After the consent process, interviewed participants rated their current pain on the NRS and FPS. Next the demographic, PEG, and APS-POQ-R data were obtained, followed by a repeat of the NRS and

FPS. Finally, participants were asked an open-ended question regarding their preference for one over the other scale. These bedside interviews took less than 15 minutes to complete by the principal investigator or a single research assistant. Initially, both the principal investigator and the research assistant (a staff RN with advanced pain training) assessed patients concurrently and compared their FPS scores to ensure a 90% agreement was reached before the research assistant independently collected data.

The Study Site 2 procedures used the same methods as Study Site 1 with the following exceptions. Data collectors completed initial training that included a full discussion of the study and research questions, ethical responsibilities in data collection, and the data collection protocol. The principal investigator or one of the co-investigators met with the data collectors each month during data collection to determine if retraining was necessary. One refresher training session was conducted. Potential participants were identified by an electronic health record–derived report of adult patients with moderate or severe pain on a participating unit. Patients were excluded from the study if they did not have pain for at least 3 months before admission. Participants were interviewed by nurse data collectors using the FPS, NRS, and PEG at time 1. The APS-POQ-R questionnaire was left with the participant to complete independently to allow time for confidential responses, given that data collectors were staff nurses at this site. When retrieved, participants were asked again to rate their pain using the FPS and the NRS. Finally, an additional open-ended question about the patient's preference for the FPS or the NRS was asked.

Instruments

Baseline Characteristics

An author-created tool was used to collect general demographic data on age, gender, education, race, and ethnicity. Also recorded was whether pain was the reason for hospitalization and if their discomfort was either an acute flare of their chronic pain or an acute pain occurring in addition to their chronic pain. The latter is sometimes described as acute on chronic pain.

The Functional Pain Scale

The FPS is a patient-reported rating of pain's perceived tolerability and interference with functioning (Gloth et al., 2001). The three questions asked include the following:

- Are you in pain?
- Is the pain “tolerable” or “intolerable”?
- Does the pain interfere with usual activities (active functioning requiring effort, like walking) or passive activities (like talking on the phone, watching TV, or reading)?

Patients who are unable to verbally communicate because of pain are rated at the highest score. Interrater reliability, validity, and responsiveness have been reported for older adults (Gloth et al., 2001). Additional testing of the FPS has been found to have interrater reliability of 0.95, and strong criterion-related validity when compared with other pain scales ($r = 0.62-0.90$) (Gloth et al., 2001). Further testing of the FPS is warranted to determine its usefulness in other populations.

The Numeric Rating Scale

The NRS is a standard one-item tool used to measure pain in clinical and research settings. The respondent selects a whole number (0–10) that best reflects the intensity of one's current pain. It is strongly correlated with the visual analog scale (historically the gold-standard measure of pain) and other (Verbal Rating Scale and the Faces Pain Scale–Revised) frequently used pain tools (Ferreira-

Valente et al., 2011; Paice & Cohen, 1997). The NRS is recommended as a measure of pain for its ease of administration and responsiveness (Chapman, Davis, Donaldson, Naylor, & Winchester, 2011) and is better able to discriminate differing levels of pain than descriptive measures (Kroenke, Theobald, Wu, Tu, & Krebs, 2012). The 0–10 NRS provides enough sensitivity to measure pain in most patients and has advantages over other pain intensity measures when collecting and interpreting clinical data (Paice & Cohen, 1997). However, as a self-report unidimensional scale it may be measuring biopsychosocial discomforts other than the physical sensation of pain.

The PEG Scale of Pain

The PEG is a three-item questionnaire asking about pain intensity plus how pain interferes with enjoyment of life and general activities (Krebs et al., 2009). The questions, asked on a numeric 0–10 scale (then summed and averaged), are as follows:

- What number best describes your pain on average in the past week?
- What number best describes how, during the past week, pain has interfered with your enjoyment of life?
- What number best describes how, during the past week, pain has interfered with your general activity?

The PEG scale is recommended to evaluate the effectiveness of chronic pain treatments (Dowell et al., 2016). Its three items are derived from the BPI, a leading multidimensional pain measure used worldwide for more than 30 years, with well-established (content, criterion, and construct) validity and reliability (internal consistency and test-retest) as an easy to use, self-reported pain measure (Gjeilo, Stenseth, Wahba, Lydersen, & Klepstad, 2007; Keller et al., 2004; Mendoza et al., 2004; Walton, Potos, Beattie, & MacDermid, 2016; Williams, Smith, & Fehnel, 2006). Although less well established, the PEG is a reliable scale ($\alpha = 0.73-0.89$), with construct validity ($r = 0.60-0.95$) reported in multiple populations (Kean et al., 2016). The PEG appears to be comparable to the BPI in terms of responsiveness to change over time, providing the best balance between single-item and longer pain scales (Krebs et al., 2009; Kroenke et al., 2012).

The APS-POQ-R

The APS-POQ-R was developed to facilitate hospital quality improvement efforts. Its five subscales include (1) affect, (2) pain severity and sleep interference, (3) perceptions of care, (4) activity interference, and (5) adverse effects. The overall internal consistency ($\alpha = .85$) and the subscales of the APS-POQ-R have been established (Gordon et al., 2010; Wang, Sherwood, Gong, Ren, & Liu, 2017). Support for the tool's construct validity and internal consistency across cultural groups were also reported in a study of nearly 10,000 surgical patients from 8 European countries and Israel (Rothaug et al., 2013). The APS-POQ-R scale is more reliable when the ratings are restricted to a 24-hour recall, rather than measurements that span multiple days (Botti et al., 2015). Items in the Activity Interference and Affective subscales were used to evaluate the validity of the FPS.

Data Analysis

Procedures for data management and analysis were similar at both sites. Data were collected, coded, and entered into an SPSS database, double checked for accuracy, then analyzed. Data could not be pooled given the inability to secure a data use agreement between the two study sites. Descriptive statistics were calculated for all variables of interest. At Study Site 1 the test–retest reliability

(reproducibility) of the FPS was evaluated using the intraclass correlation coefficient (ICC) method. The values of ICC vary from 0 (totally unreliable) to 1 (perfectly reliable), and values > 0.80 were considered as evidence of excellent reliability (Nunnally & Bernstein, 1994). The ICC was also calculated for the NRS, which is sensitive to change, to ensure a change in pain intensity during the data collection interview was not confounding this reliability measure of the FPS.

Pearson *r* correlations were conducted to test criterion-related convergent and discriminant validity. Spearman's correlation (ρ) was substituted in the absence of a linear relationship between variables being tested. Support for convergent validity was set at strong ($r = 0.6$ – 0.79) or very strong ($r = 0.8$ – 1) comparing the NRS with calculated FPS and PEG scale scores. Divergent validity was supported if correlations were weak ($r < 0.4$). Items from the Activity Interference and Affective subscales from the APS-POQ-R were used to test the ability of the FPS to discriminate from these concepts. The cut point $p < .05$ was used to support statistical significance. To determine FPS validity regardless of pain severity, the participants were split based on NRS scores into severe (pain ≥ 7) and lower (pain = 0–6) intensity values (Boonstra, Schiphorst Preuper, Balk, & Stewart, 2014) with correlations again reexamined between the FPS and NRS.

Results

Study Site 1

The sample at Study Site 1 included 93 participants, mostly Caucasian, 21–81 (mean = 51) years old, with men and women equally represented (Table 2). Participant means reflected moderate to severe pain (NRS = 6.6; FPS = 5.7; PEG = 7.9) on all three pain scales at the time of the interview. Nearly half of the participants were admitted for uncontrolled pain. The FPS had good test-retest reliability with an ICC of $r = 0.83$ (confidence interval = 0.75–0.89), which was statistically significant ($p < .001$). The stability of pain intensity during the interview was supported using the ICC statistic of 0.90 (confidence interval = 0.85–0.94) and a *t* test ($t = 1.7$, $p = .08$) by comparing NRS scores from the beginning to end of the interview and supporting there was no significant change in pain from the pretest to posttest time interval.

Convergent validity was also supported with strong correlations between the FPS and NRS ($r = 0.75$; $p < .01$) but not between the calculated FPS and PEG ($\rho = 0.43$; $p < .01$) scores (Table 3). Splitting respondents into higher (7–10; $n = 47$) and lower (0–6; $n = 46$) scores on the NRS resulted in lower correlations between the FPS and NRS ($r = 0.52$ – 0.62 , respectively). There were no strong correlations between the FPS and the APS-POQ-R activity interference subscale. Discriminant validity tests indicated weak correlations ($r = 0.22$ – 0.34) with single items from APS-POQ-R measures of pain-related anxiety, fear, depression, or helplessness. Many participants had no stated preference for either the NRS or FPS,

describing either or both as appropriate for hospital use. Among those participants ($N = 51$ [55%]) with a stated preference, 63% preferred to discuss their pain in functional terms, with the remainder preferring a numeric rating system.

Findings Site 2

Data from 51 participants with chronic pain were included in the analysis. Given missing data and variability in the time between pre- and postassessment measures, time 2 measures of pain intensity are not reported for this site. Participant means reflected moderate intensity pain (NRS = 4.8; FPS = 4.0; PEG = 7.2) on all three pain scales at the time of the initial interview. The final sample described in Table 2 was representative of the community served. The relationship between the NRS and FPS did not meet criteria for strong correlation requirements ($r > 0.6$) to support convergent validity given a moderate correlation ($\rho = 0.45$, $p < .001$) at this site. The FPS also failed to meet criteria for convergent validity with the PEG, given a weak correlation of $\rho = 0.28$, $p = .04$. Similarly, there were weak correlations between the FPS and pain-related anxiety, depression, fear, and helplessness items on the APS-POQ-R, indicating the FPS was able to discriminate between these items (Table 3). There were no significant correlations between the FPS and the APS-POQ-R activity interference subscale.

Thirty-one participants expressed a scale preference, with 65% preferring the FPS ($N = 20$). A reason given was that the FPS allowed for a more detailed description of their pain and how it affects their life in a way the NRS did not capture. One participant stated that she could be quite functional even if the NRS rating was high. Participants also thought the FPS would be more helpful to the nurses in providing pain management.

Discussion

The performance of the FPS was not consistent across sites. In a setting where it had been used for many years after focused training and retraining as part of quality improvement activities, it had reliability and concurrent validity with the NRS. This reliability and validity were not as strong in hospitalized patients with chronic pain as that reported by in prior studies of older adults and nonhospitalized populations (Gloth, 2010; Gloth et al., 2001; Pautex et al., 2006). At the second site, where this was a novel approach to pain assessment, the benchmark to establish concurrent validity with the NRS was not met. Weak correlations indicated the FPS was able to differentiate pain from anxiety, depression, fear, or helplessness, which are different but are known to drive up self-reported measures of pain (Okifuji & Turk, 2012). Measures of current pain (e.g., NRS and FPS) were more strongly correlated than with measures of pain that required an average pain score over the past 24 hours (APS-POQ-R) or the past 7 days (PEG), respectively. Thus these latter two scales would be inappropriate reassessment tools in acute hospital settings where sensitivity to changes within an hour of an intervention is desired.

The FPS correlations diminished when a median split of participants by NRS was done, with correlations remaining strong ($r = 0.62$) for those with mild to moderate pain intensity (Boonstra et al., 2014), but falling slightly ($r = 0.52$) for those with severe pain. One participant reported a score of 0 despite confirming a history of chronic pain. This supports the fact that people with chronic pain may have pain-free intervals or it may reflect some of the inherent flaws of the NRS and other subjective measures of pain described earlier. Finding a pragmatic, reliable measure to objectively assess chronic pain and response to therapy may someday be possible using subjective and objective clinical data, biomarkers for chronic

Table 2
Sample Demographic Characteristics

	N	N
	Study Site 1 (N = 93)	Study Site 2 (N = 51)
Female	46 (49.5%)	32 (62.8%)
College educated*	50 (53%)	23 (45.1%)
Caucasian	67 (72.8%)	46 (90.2%)
Admitted for pain control	42 (45.7%)	19 (37.3%)
Both acute and chronic pain	76 (87.7%)	26 (51%)

* Attended some college or earned degree(s).

Table 3
Convergent and Divergent Correlations With Functional Pain Scale

	Correlation Study 1 Site 1 (N = 93)		Correlation Study 2 Site 2 (N = 51)	
Numeric Rating Scale	$r = 0.75$	$p < .001$	$\rho = 0.45$	$p < .001$
PEG	$\rho = 0.43$	$p < .001$	$\rho = 0.28$	$p < .05$
Anxiety*	$r = 0.28$	$p < .01$	$r = 0.01$	$p < .90$
Depressed mood*	$r = 0.23$	$p < .05$	$r = 0.09$	$p < .44$
Fear*	$r = 0.25$	$p < .05$	$r = 0.06$	$p < .56$
Helpless*	$r = 0.34$	$p < .01$	$r = 0.21$	$p < .07$

FPS = Functional Pain Scale; PEG = Pain, Enjoyment of Life, and General Activities Scale.

* Correlation between FPS score and items from APS-POQ-R scale.

pain, and functional neuroimaging combined (Borsook, Becerra, & Hargreaves, 2011), but there are legal, ethical, and technological barriers to overcome before this can be realized (Davis, et al., 2017; Martucci & Mackey, 2018).

Despite some population differences between study sites, there was a stronger level of support for the FPS concurrent validity at Study Site 1 than the other setting. It is unclear if familiarity with the tool or slight variations in population, setting, or methods was a factor. Despite these differences, both the NRS and FPS remained similarly able to discriminate pain from anxiety, depression, fear, and helplessness items on the APS-POQ-R. The FPS was also supported as an acceptable method to assess pain, which some participants preferred.

Limitations

There are several limitations to this study. This evaluation of the psychometric properties of the FPS in an acute care setting involved a convenience sample of 144 participants at two different sites. These convenience samples may not be representative of other populations of hospitalized patients and thus the results may not be generalizable. The sample focused on patients with chronic pain and may not be generalized to those with acute pain without further testing. Participants were predominantly Caucasian; on general medical or surgical units, and thus these findings may not reflect patients of different acuity levels; racial and ethnic minorities; those unable to speak, read, or write in English; or those being treated for a psychiatric disorder.

A potential study strength was the ability to test the validity of the FPS at two institutions. Study Site 1 had used the FPS for 10 years, whereas the tool was new to Study Site 2. However, these sites used different methods (single interview versus combined interview and questionnaire) and timing of second NRS and FPS measures. The later difference precluded the ability to analyze test-retest reliability data at the second study site and may account for correlation differences identified between the FPS and APS-POQ-R. The short time between test–retest measurements could be attributed to memory and not stability of the FPS tool.

It is noteworthy that after the proposal for this study was submitted for approval, the IOM definition of chronic pain as lasting more than 3 months was changed to pain persisting longer than 6 months in the National Pain Strategy (Institute of Medicine (IOM), 2011; U.S. Department of Health and Human Services, 2016). Study Site 2 used the IOM cut point of 3 months as a definition of chronic pain (Institute of Medicine (IOM), 2011), whereas Study Site 1 used a 6-month duration as is now recommended (U.S. Department of Health and Human Services, 2016). The inability to secure a data use agreement prevented the investigators from pooling data sets for further analysis. Items from the Activity Interference and Affective subscales from the APS-POQ-R were used to test the ability of the FPS to discriminate between these concepts rather than

specific tools to measure these constructs. Although this study provides an initial glimpse and directions for further study, a larger scale multisite study that overcomes these limitations is needed to confirm the FPS's psychometric properties and utility for use with hospitalized patients.

Implications

Studies at both sites evaluated the psychometrics of the FPS in acute care settings. Implications for nursing education, practice, and research emerged during the study.

Nurses at Study Site 1 were familiar with the FPS, whereas the nurses at Study Site 2 had to incorporate the new scale into their workflow. In a debriefing at the end of data collection, Study Site 2 nurses reported that using the FPS and having the conversations that were initiated by the tool did not adversely affect their workflow. This is an important implication when using a new assessment tool. Historically, one of the positive features of using the NRS has been that in addition to being valid and reliable it was also a fast and easy assessment tool.

Research implications include further testing of the FPS in a variety of settings. Further studies of the tool's utility in acute care settings is warranted. This includes testing its sensitivity to factors known to increase or reduce pain. The FPS may be beneficial in primary care settings. Krebs, Carey, and Weinberger (2007) found that when using the NRS for Pain screening, nearly a third of patients with pain-related functional interference had a NRS score of 0. In this case a functional measure may be more informative when designing a plan of care. An additional research focus could be patients with different types of pain. Both sites included participants who had chronic pain in addition to experiencing acute pain during their hospitalization. Asking about pain tolerability and functioning were deemed relevant by participants with mixed pain conditions. Investigators found the FPS difficult to score at times because of factors related to hospitalization. Therefore further testing of a revised "hospital version" is recommended (Table 1) to help transform the way pain is understood, assessed, and treated (Institute of Medicine (IOM), 2011).

Conclusions

The FPS performed as an acceptable alternative to the NRS for hospitalized adults with chronic pain. Some participants preferred it over the NRS to discuss both the pain and its personalized impact. We found evidence for the reliability and validity of the FPS in hospitalized adults. The tool was found to be strongly correlated with the NRS in a setting where it has been used for several years; yet correlations were only moderately strong when tested in a new setting. The development of a revised version may be warranted to better discriminate the extent to which pain interferes with the patient's ability to participate in prescribed activities required during their hospital stay. As validated, the FPS is acceptable to patients and pragmatic for nurses to use once trained. Asking patients about the tolerability of pain and its effect on functioning has the potential to better guide chronic pain therapy than reports of its intensity alone.

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