Reliability Testing of the Psychosocial Vital Signs Assessment Tool

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ABSTRACT
The current article describes preliminary psychometric testing of the Psychosocial Vital Signs (PVS) Assessment Tool, a tool for assessing psychosocial variables of health to enhance holistic patient-centered care. The five psychometric measurements of the PVS Assessment Tool include four patient self-reporting items: (a) perception, (b) support, (c) coping, (d) anxiety, and one clinician observation item of (e) anxiety level. A simple psychometric design was used for testing the PVS Assessment Tool for internal reliability among the five measurement items and interrater reliability of the clinician observation item of anxiety level. A convenience sample of nursing students was used to test the tool. Thirty-two tools were used for testing internal reliability and 29 paired tools were used for interrater reliability testing of the clinician observation item. A Cronbach’s alpha of 0.806 determined satisfactory internal reliability and a Cohen’s kappa of 0.808 determined satisfactory interrater reliability. [Journal of Psychosocial Nursing and Mental Health Services, 53(11), 39-45.]
Personal health events experienced as times of crisis impact individuals’ physiological and psychosocial well-being. Nurses remain the most trustworthy of clinicians to whom patients look for responding to their needs during those crises (Riffkin, 2014). Although further research is urged on the clinical relevance of routine vital signs (Storm-Versloot et al., 2014), vital signs provide a focused and immediate baseline view of a patient’s physiological responses to health events. Physiological variables, such as blood pressure, pulse, temperature, and respiration, offer signs of a patient’s health status to which nurse clinicians quickly and skillfully respond. Nurses are also required to hear and see what is often not spoken or behaviorally expressed about what a patient is thinking, feeling, and experiencing in response to and during health events. Health variables from these cognitive, affective, behavioral, or spiritual dimensions of human response need to be recognized and easily assessed. Psychosocial vital signs (PVS), a concept first defined by Spade (2008), was designed to provide a baseline view of psychosocial variables in patient assessment. A subsequent article by Spade and Mulhall (2010) provided detailed methodology and strategies for teaching the concepts and application of the PVS Assessment Tool. The tool was tested while being used by nursing students during classroom and laboratory simulations. The current article describes the preliminary psychometric testing of the PVS Assessment Tool for internal and interrater reliability. A secondary purpose of the current study is to expose the concept of PVS to relevant clinical settings of nursing while encouraging its use in routine baseline patient assessment, research of PVS-identified essential psychosocial health variables, and further development as a tool.

Although the PVS Assessment Tool (Figure) is structurally composed of three sections—Patient Self-Reporting, Clinician Observation of Anxiety, and Clinician Observation of Human Responses—preliminary testing of the tool was limited to the psychometric properties in the quantitative sections of patient self-report and clinician observation of anxiety. The third section, which is qualitative in nature, is not appropriate for simple metrics and, therefore, was not tested.

The PVS Assessment Tool identifies four essential psychosocial variables of health as (a) the patient’s perception (i.e., thoughts) of a health situation, (b) the patient’s sense of situational support, (c) a sense of being able to cope, and (d) the felt experience of anxiety. The clinician’s subjective measurement of the patient’s anxiety level is also included in PVS assessment (Spade & Mulhall, 2010). During assessment, the identified psychosocial variables are elicited from the patient and observed by the clinician while patient and clinician are engaged in meaningful dialogue. In this process, patients are provided a means for sharing perceptions and concerns surrounding their health situation. The dialogue that ensues widens the clinician’s holistic view of the patient’s well-being (Spade & Mulhall, 2010).

BACKGROUND

Conceptual basis for the PVS Assessment Tool is rooted in theoretical understanding of crisis and crisis intervention, anxiety, and relational dynamics of professional practice. Aguileras (1998), a crisis and crisis intervention theorist, identified three factors needed for individuals to recover and grow from crisis situations: (a) adequate perception, (b) adequate support, and (c) adequate coping. She developed her theory on the foundational work of Eric Lindemann, a renowned psychiatrist known in the late 1940s for his professional and theoretical knowledge of acute trauma and grief, and the early crisis work of Caplan (1964). The three crisis recovery factors identified by Aguileras (1998) have remained, over time, the pertinent conceptual basis for current clinical practice in psychological counseling and nursing care (Chase, 2013; Myer & Moore, 2006). Aguileras’s (1998) crisis recovery factors are evident in more recent models of crisis intervention and crisis management programs that contain, indirectly, the fundamental elements of assessing and responding to individuals’ and groups’ cognitive perceptions during crises, their need for support, and their need for coping (Denny & Kienhuis, 2011; Saunders & Hawton, 2013; Vincent, McCormack, & Johnson, 2015). According to Spade (2008), health status change is viewed as a time of crisis that may be major or minor depending on an individual’s resources related to factors identified by Aguileras (1998).

Anxiety, a human phenomenon subjectively experienced at various levels of intensity, is objectively observed by the clinician (Stuart, 2012). Common knowledge among nurse clinicians is the realization that anxiety not only impacts physiological responses in a patient (e.g., increased heart rate), but also affects cognitive, affective, behavioral, and spiritual dimensions of human response. Altered thought processes and content, labile emotions, erratic behavior, and severe hopelessness are examples of such response. These responses are indicative of psychological and social needs of the patient to which the nurse clinician is ethically bound to meet as a competent provider of holistic care. A dynamic, goal-oriented, and patient-centered relationship provides the safe context or forum in which these needs (i.e., psychosocial variables of health) are collaboratively addressed between patient and clinician (Benner, 2004; Jonsdottir, Litchfield, & Pharris, 2004; Perraud et al., 2006). With its interactive structure in eliciting patient responses, the PVS Assessment Tool is designed to facilitate this collaborative process. Observation of a patient’s non-verbal communication and effective communication skills of the clinician are integral to the process (Spade, 2008; Spade & Mulhall, 2010).
Figure. Psychosocial Vital Signs (PVS) Assessment Tool. A baseline assessment of psychosocial variables of health, including psychometric measurement of patient/client self-reporting, clinician observation, and narrative descriptors of observed human responses. Note. WNL = within normal limits; VS = vital signs; SOB= shortness of breath; N/V = nausea/vomiting.

For a copy of the tool, please contact the author, C. Spade, at charspade@comcast.net.
The three-fold purpose of PVS is defined by Spade and Mulhall (2010) as a way of widening the holistic baseline assessment of a patient and communicating that assessment with colleagues, facilitating the initial phases of the relationship, and providing a forum for the patient’s sharing of needs and concerns. As a tool that measures perceptual variables, the PVS Assessment Tool is an adaptation of the typical visual analog scale (VAS), such as the one for pain, often used in health care (Houser, 2015). Unlike similar tools, such as the Distress Thermometer (Carlson & Bultz, 2003) where patient self-reporting of psychosocial variables is done with computerized screening, PVS assessment offers the immediacy of a patient–clinician interaction where timely clinical observation and intervention are achieved (Spade & Mulhall, 2010).

The five psychometric measurements of PVS comprise four patient-reported numerical ratings of the four identified psychosocial variables and one clinician observed item of anxiety level (Figure). During assessment, after rapport is established, the clinician uses verbal prompts to elicit an ordinal rating (scaled from 1 to 10, with lower scores indicating better outcomes) from the patient for each of the variables. As self-reported, the patient’s ordinal ratings are subjective data of PVS assessment.

The clinician’s observation of the patient’s anxiety level, although also an ordinal rating scaled from 1 to 4, is objective data. It can be seen in the patient’s behavior (e.g., fidgeting), heard in his/her speech (e.g., rapid and loud, expressing distorted thoughts), and observed in physiology (e.g., increased pulse, urinary urgency) during assessment (Spade & Mulhall, 2010). The PVS Assessment Tool provides criteria for rating anxiety, as suggested by Stuart (2012), at levels of mild (1), moderate (2), severe (3), or panic (4). An abbreviated summary of the patient’s ratings is noted with the clinician’s rating placed in brackets (Figure).

**METHOD**

Simple psychometric testing of the PVS Assessment Tool was performed in two phases, each at different U.S. universities. Phase 1 tested internal reliability of the tool and took place in academic year 2012. Phase 2, which tested interrater reliability, took place in academic year 2013. A convenience sample of nursing students tested the tool. During Phase 1, use of the tool by pre-licensure nursing students for testing internal reliability proved successful. In Phase 2, initial attempts in attaining satisfactory interrater reliability of the tool used by pre-licensure nursing students were unsuccessful. The final attempt was successful for testing interrater reliability with use of the tool by post-licensure nursing students. Other than this distinction, as the tool and its quantitative reliability properties was the focus of testing, no characteristics of the individuals using the tool were analyzed.

**Phase 1 Internal Reliability**

**Procedure.** In Phase 1, 35 pre-licensure baccalaureate nursing (BSN) students were prepared for pilot use of the PVS Assessment Tool. They viewed a slideshow with mini-lecture explaining conceptual bases of PVS and its use. After reviewing the specific items of PVS measurement, the BSN students observed a simulation scenario in which two faculty role played PVS assessment and a patient experiencing anxiety. Simulation scenarios, used in both reliability tests of the PVS Assessment Tool, were medical-related patient situations created by the authors (C.M.S., K.E) and faculty with theoretical understanding of PVS and clinical expertise related to manifestations of anxiety. The simulated patient roles portrayed characteristic manifestations of anxiety as are listed in the PVS Assessment Tool. Following faculty demonstration and using simulation scenarios provided, students engaged in PVS assessment role play; they had the opportunity to play both parts (i.e., nurse and patient). Using the tool’s verbal prompts, each student elicited and recorded a simulated patient’s ratings on the scale from 1 to 10 for each of the four psychosocial variables. Using the tool’s clinician observation of anxiety, each student rated the patient’s anxiety level on the scale from 1 to 4, designating a mild to panic level. Thirty-five tools were collected, and because items were left blank in three tools, a total of 32 tools were used for internal reliability analysis.

**Results.** SPSS version 19.0 software (used for all analyses) was used to level the rating scales of the patient self-reporting variables and clinician observation to a standard comparison. After standardization, analysis of the five psychometric measurements of the PVS Assessment Tool demonstrated satisfactory internal reliability (Cronbach’s alpha = 0.806).
Phase 2 Interrater Reliability

Procedure. For interrater reliability of the PVS Assessment Tool, three attempts were made to test the null hypothesis: The ratings for anxiety as measured by the PVS Assessment Tool will not be the same for two subsequent raters. In all attempts, preparation of students for using the tool included viewing a slideshow with mini-lecture explaining the conceptual basis of PVS, reiteration of the theoretical framework of crisis theory, and faculty demonstrations that were performed in the classroom and through video role play. As with internal reliability testing stated above, role-play scenarios used for portraying the roles of nurse and patient in PVS assessment were created by the authors and expert nurse colleagues as medical-related patient situations. Students portrayed both roles (i.e., nurse and patient). As with internal reliability testing of the PVS Assessment Tool, students were informed that the process for learning how to use and participate in the testing of the tool was an ungraded activity. One university required an internal review board process, which granted exempt status for student participation in the testing process.

In the first attempt to test the null hypothesis, 32 pairs of pre-licensure nursing students used the tool in patient–nurse simulated role play where each paired student as instructed, without consulting their partner, observed and rated the same patient’s anxiety level. The 32 paired tools were collected and data analysis showed weak interrater reliability (Cohen’s kappa = 0.378). The null hypothesis could not be rejected. There was concern that the visual structure of the tool’s narrative listing of anxiety criteria was vague and the level of anxiety could not be easily determined. Consequently, the tool was changed into its current table format (Figure, Clinician Observation of Anxiety) to provide a clearer visual listing of the clinician observation criteria and numerical measurement of anxiety levels. A second attempt at testing the null hypothesis, with 22 pairs of pre-licensure students using the revised tool during simulation role play, demonstrated slightly improved interrater reliability (Cohen’s kappa = 0.584). At this time, a question was raised as to the appropriateness of pre-licensure students’ use of the tool for interrater testing. A concern was that students needed greater comprehension of how anxiety is specifically manifested in human responses and practice in applying this knowledge. This concern prompted a change in the selection of students using the tool.

Thus, 58 post-licensure nursing students enrolled in RN/BSN and family nurse practitioner programs were invited to participate in a third attempt for testing interrater reliability of the PVS Assessment Tool with the null hypothesis remaining: The ratings for anxiety as measured by the PVS Assessment Tool will not be the same for two subsequent raters. Students’ preparation activities included viewing a slideshow explaining the conceptual basis of PVS, a short video of faculty demonstrating use of the tool through simulated role play, and a mini-lecture with slides reiterating the theoretical framework of Aguilera’s (1998) crisis theory. Five different simulations were used in which 29 pairs of students observed and rated anxiety levels of simulated patients. As paired observers, students were instructed to complete their clinician observations of the same patient without consulting one another. They were observed by faculty and investigator (C.M.S.) to follow that instruction (i.e., to not consult one another) as they completed and submitted PVS Assessment Tools for statistical analysis.

Results. Data analysis of the 29 paired PVS Assessment Tools was performed. Cohen’s kappa measurement of agreement (0.801) demonstrated satisfactory interrater reliability. Pearson’s chi-square was not significant (0.808), which indicates the paired ratings were not significantly different. The null hypothesis was rejected and it was concluded raters’ ratings were statistically the same.

DISCUSSION

Reliability of an instrument demonstrates consistency in the accuracy of variables being measured by the tool. When a tool is reliable, the user can be confident that differences in variable measurements are related to

KEYPOINTS


1. Psychosocial variables of health are vital components of holistic patient-centered care.

2. Psychosocial vital signs (PVS) assessment defines psychosocial variables as subjective experiences of the patient and objective observations by the clinician.

3. The PVS Assessment Tool facilitates an interactive and collaborative process between patient and clinician during assessment of psychosocial variables.

4. Satisfactory reliability of the PVS Assessment Tool provides credibility for its use in practice settings and clinical research.

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differences in individuals rather than in the way a variable is measured (Houser, 2015). Internal and interrater reliability are essential aspects of stability within an instrument and across raters, respectively, and are measured mathematically. Internal reliability stability is quantified by Cronbach’s alpha coefficient of consistency and “should have a value of 0.7 or greater” (Houser, 2015, p. 200). Cohen’s kappa, the preferred correlation statistic for quantifying the stability of interrater measurements, should have a minimum value of 0.80 (Houser, 2015). Pearson’s chi-square, a test of statistical significance generated in SPSS analysis, quantifies significant differences that may exist between raters. The chi-square value of 0.80 for PVS Assessment Tool interrater reliability testing indicated that differences in observers’ ratings were not significantly different. This nonsignificant difference allows the conclusion that observers’ ratings were in agreement and the agreement was not due to chance.

As tested, the PVS Assessment Tool demonstrates satisfactory internal and interrater reliability. With satisfactory reliability, the tool provides predictability in assessing the baseline view of essential psychosocial variables as defined in PVS. As such, the tool holds clinical value for practice as well as research.

CLINICAL IMPLICATIONS

PVS has clinical value in widening a holistic view and care of patients. Combining patient self-reporting and clinician observation of psychosocial variables of health, PVS offers a baseline reference point for collaborative assessment between patient and clinician and serves as a forum for communicating findings among clinicians (Spade & Mulhall, 2010). As a structured context for goal-directed interactions between patient and clinician, the PVS Assessment Tool provides the patient a means for sharing subjective experiences and for the clinician’s objective observations related to those experiences. Its use can provide the impetus for in-depth evaluation of psychosocial variables, such as when an experience of anxiety may be associated with suicide ideation (Hermes, Deakin, Lee, & Robinson, 2009). Assessment of the variable of perception may indicate further evaluation related to perceptual distortions. These distortions may be gently challenged with de-catastrophizing techniques (Kennedy, Duff, Evans, & Beedie, 2003; Spirito, 1997). Assessment of a patient’s sense of being able to cope can be the basis for engaging him/her in an individualized teaching–learning process, such as in the strategies of mindfulness (van den Hurk, Schellekens, Molema, Speckens, & van der Drift, 2015). When the patient identifies no one as support, the clinician can offer immediate assurance of intentional presence.

Further clinical relevance of PVS assessment relates to recent work by Juve-Udina et al. (2014), who evaluated effective communication as an essential component of basic nursing care. As stated by Spade and Mulhall (2010), effective communication skill is the key competency in assessing PVS. To further enhance the dialogue initiated during assessment, Spade and Mulhall (2010) developed an algorithm in which potential themes in patient response are identified for each psychosocial variable. Communication interventions included in the algorithm provide a useful repertoire of skills for the clinician. Investigation of the validity and use of this algorithm could be an aspect of further development in PVS assessment.

CLINICAL RESEARCH IMPLICATIONS

Although preliminary reliability testing of the psychometric quantitative measurements in the PVS Assessment Tool provides confidence in the internal and interrater stability of the tool, further development and testing of the tool is needed. Formal content and construct validity are recommended for its further development as an assessment tool and its use for research in clinical settings. Confidence in reliability of the PVS Assessment Tool allows its use in clinical research related to psychosocial variables of patient perception, sense of support, sense of being able to cope, and the felt experience of anxiety.

Broadly stated, research questions related to psychosocial variables could include:

- How do psychosocial variables of PVS influence one another?
- Does PVS assessment provide an alert for in-depth psychosocial evaluation as may be needed when a sense of hopelessness is associated with suicide ideation (Hermes et al., 2009), and at what point of the patient self-reporting scale does an alert occur?
- What are nurses’ perceptions regarding the use of PVS assessment as essential in nursing care?
- Does the structured relational context of PVS assessment influence patient satisfaction in nursing care?

CONCLUSION

Assessment of essential psychosocial variables of health enhances the baseline view of patient well-being and provides a means for initiating holistic patient care. The current article described the preliminary psychometric reliability testing of the PVS Assessment Tool, which measures psychosocial variables from the subjective perspective of the patient and the objective observations of the health clinician. Although satisfactory reliability of the tool, as tested in the academic setting, provides credibility for its use in clinical and research arenas, clinicians and researchers are encouraged to explore its effectiveness in their patient assessments and, as suggested above, its value when investigating psychosocial variables of health. Further development of the PVS Assessment Tool, such as construct and criterion validity, is warranted for greater credibility in its value to enhance an initial holistic view of patient well-being.
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