ASSESSING AN INSTRUMENT IN A PILOT PROJECT: THE SELF-CARE AGENCY QUESTIONNAIRE

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The use of sound measurement instruments and practices in nursing research is fundamental to the advancement of nursing knowledge. By using clearly developed and effective approaches to measure variables, internal validity is improved and error in investigations is reduced (Strickland & Waltz, 1986). Without this precaution, any research study is uninterpretable, and the results are questionable (Campbell & Stanley, 1963).

Increasing interest in developing tools to measure phenomena from a nursing perspective has produced an increasing number of published instruments. However, despite this effort, many tools have not been tested in a variety of settings or with different populations, and they have not been used extensively in subsequent investigations. Strickland and Waltz (1986) argue that it is inefficient for researchers to construct their own measures. They believe that progress in measurement would be facilitated if efforts were directed toward developing and testing existing instruments. Increased rigor in measurement resulting from these efforts would allow increased confidence in the findings and interpretations drawn from nursing studies.

Although reliability and validity of an instrument may have been established, it can not be assumed that these are a stable property in all situations, with all subjects. Evaluating the appropriateness of an existing tool prior to completing data collection is, therefore, an important step. Instruments that fit the theoretical framework and design of the study can and should be assessed in a pilot study (Van Ort, 1981). Using this approach, reliability and validity of the instrument can be established and measurement problems identified. If the instrument is found to be unsuitable, efforts to design a new instrument are then warranted.

The pilot study has been described as one of the most important steps in the research process (Van Ort, 1981). Although it is more limited in scope and

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sample size than the major study, the pilot study should be conducted with just as much care and precision. A pilot study provides an important opportunity for researchers to determine whether or not the proposed design and method of a major study will yield appropriate data for the research question. Ultimately, the results can prevent problems in the major project.

The contributions that pilot studies can make in evaluating the potential of existing nursing measures to collect data in other settings or with other populations have not been clearly described. To illustrate the process of evaluation of a tool prior to its use in a major study, a description of the author's experience in piloting an instrument designed to measure self-care agency will be presented.

Background to the major study

Many nurses who are involved with older adults in nursing homes are now incorporating the promotion and support of self-care practices as an important part of their nursing interventions. In planning an investigation to see if these interventions were effective in increasing ability to care for themselves, instruments to measure changes in self-care abilities were sought. As Orem's Self-Care Model (1979, 1985) provided the theoretical framework for the study, persons were viewed as possessing self-care agency. Orem refers to self-care agency as a "learned human capacity" for engaging in self-care, which includes certain human powers that must be existent or capable of being put into operation before an individual can engage in self-care activities. The Nursing Development Conference Group (Orem, 1979) theorized that self-care agency consists of ten "power components" or prerequisite capabilities for engaging in self-care operations. As such, the ability to perform actions to meet individual health needs can vary at different times, according to the values of each of the ten components. Assessment of self-care agency may be more complete if objective assessments of functional ability are combined with an assessment of the patient's own perceptions of self-care agency (Kuriansky, Gurland & Fleiss, 1976); therefore, an instrument was sought to measure older adults' perceptions of self-care agency.

The only instrument available that measured all ten power components of self-care agency was the Perception of Self-Care Agency Questionnaire (PSCAQ) developed by Bickel and Hanson (1981). This questionnaire consists of 53 items, of which 32 items are positively worded and 21 are negatively worded (i.e., reversed items). Subjects are asked to respond to each item using a five-point Likert Scale that ranges from "never like me" to "always like me." Examples of the kinds of items subjects are asked to respond to include:

"I can select what is important to solve a problem."
"I forget what I've learned that will help me take care of myself."
"I have good muscle strength."
"It doesn't matter to me if I take care of myself or not."
"I have the abilities I need to care for myself."

Validity and reliability estimates for the PSCAQ were reviewed to examine the potential usefulness of this instrument with older adults in nursing homes. No investigations were found that used this instrument specifically with this population. However, estimates had been reported for non-hospitalized adults. Some individuals from senior citizen groups were included in this research, but the proportion of individuals over 65 years making up the sample was not reported.

Content validity for this questionnaire was established with the rating of an item pool by five experts in self-care deficit theory (Hanson & Bickel, 1985). On the basis of their evaluation, 120 items were selected and tested in a pilot study. Items were selected for a reduced form of the questionnaire using item correlations and item standard deviations. Results of a second pilot study, which included 100 persons of both sexes who were over the age of 21 years and were not hospitalized, found the 53-item questionnaire internally consistent with an alpha coefficient of 0.93. The instrument includes ten sub-scales, each measuring a different power component of self-care agency; as such it is unusual that the alpha coefficient is this high. The authors also report that alpha coefficients for statements representing each of the ten power components indicate internal consistency when the instrument is used with adults, although actual coefficients were not reported. These results are not consistent: a multidimensional instrument cannot be internally consistent as a whole, and with respect to its sub-scales, at the same time.

The factorial structure of the PSCAQ was also assessed with a sample of 456 healthy adults (Hanson & Bickel, 1985). The mean age of the sample was 37.9 years (S.D.=14.6 years). Five factors with eigenvalues greater than 1.0 were revealed, accounting for 86.4% of the variance. The factors were identified as cognitive, cognitive limitations, motor, motivation and repertoire of skills. Hanson and Bickel report that these factors corresponded to all but three of the power components of self-care agency, which included the ability to maintain attention and exercise vigilance, the ability to prioritize self care actions and the ability to integrate self-care actions within one's life. While the factors revealed do not completely mirror the ten power components of self-care agency, they are consistent with the construct of self-care agency. However, the emergence of Factor 2, termed "Cognitive Limitations", suggests that the technique of asking questions, rather than cognition, may be a factor being measured by the questionnaire. The fact that seven negatively-worded items that were related to cognitive abilities clustered to form this factor adds further weight to this position.

Despite these obvious limitations, the tool appeared to have face validity, from the researcher's perspective, in that it attempted to assess all ten components of self-care agency, and it was decided to pursue evaluation of the appropriateness of the PSCAQ with older adults in a pilot study. If the instrument showed potential for use with older adults, further testing and development would be warranted, and the instrument would be selected for use in the proposed study.

The pilot study

The purpose of this pilot study was to evaluate the appropriateness of the PSCAQ with older adults residing in nursing homes. Efforts were directed at determining whether the instrument would yield data that would be useful in testing hypotheses and in identifying measurement problems related to characteristics of the instrument or the measurement process. The pilot sample, setting and methods were selected to reflect those of the proposed major study. Weakness detected could, therefore, be expected to be representative of the target population and setting for the major study.

Method

A convenience sample of 34 nursing home residents who were 60 years or older, able to speak and read English, able to give informed consent and who had no serious psyho-geriatric symptomatology were asked to participate in this study. Seven residents meeting the study criteria refused to participate, leaving a study sample of 27.

Each subject was given instructions as to how to complete the PSCAQ. For the 21 participants who indicated a need for assistance, the questionnaire was administered in an interview format with the researcher reading each question to the subject. Some guidance was given to help subjects choose an appropriate response to negatively worded items when they understood the question but had difficulty choosing a correct response. Following completion of the questionnaire subjects were interviewed to obtain their reactions to it. Comments of subjects who responded to the items in an interview format were also recorded.

Results

Sample

The mean age of the sample was 78 years, with ages ranging from 63 to 94 years. Seventy percent of the group was female. The largest proportion of subjects (38.5%) had resided in this nursing home for less than one year.

Seventy-four percent of the subjects had not graduated from high-school, with two-thirds having completed less than nine years of schooling.

Data yielded by the Perceptions of Self-care Agency Questionnaire

A complete description of older adults' perceptions of self-care agency was not obtained with this measurement tool as many sub-scales included items that respondents found difficult to answer or understand. Only four of the 27 participants were able to complete all 53 items of the PSCAQ. Therefore, it was evident that, if this instrument was used in the main study, little usable data would be obtained.

From the limited data provided by the PSCAQ and subjects' comments prompted by the items of this instrument, several observations were made. Some components of self-care agency appeared to be more important than others for these individuals. Not surprisingly "one's ability to move body parts" was very important, and, for many, it was a major factor determining the amount and kind of assistance required. However, respondents' perceptions of their abilities or desires to participate in determining the most appropriate kind of assistance required varied greatly. Of less importance for many was the ability to reason or make decisions, especially if they viewed "caring for themselves" as something they had done automatically for years. Several who considered themselves "capable of solving problems and making decisions" (related to self-care) believed that nursing home staff did not recognize these abilities. Losses of ability to care for themselves associated with advancing age or health problems were clearly recognized and, in some cases, expected. For some, this denoted a need for increased assistance; for others, it denoted a need for new skills. Confusion among ability, needs and desires was often evident. For example, some patients, who clearly wanted to be involved in their own self-care, described themselves as capable of caring for themselves despite clearly visible physical handicaps that would suggest otherwise. On the basis of these observations, it appeared that perceptions of self-care agency among the elderly can vary considerably and may be useful in explaining or predicting their participation in self-care activities. However, the PSCAQ, in itself, was not sensitive enough to identify these differences.

Problems in measurement

During the process of administering this questionnaire, several problems were identified in relation to measuring self-care agency using the PSCAQ. Problems encountered related to comprehensibility, accuracy and administration of the instrument. Each of these problems will be discussed in further detail, concluding with opinions shared by the respondents concerning the instrument as a whole.

Comprehensibility. In four of the ten sub-scales, less than 50% of the sample completed all items. Words and phrases, such as "signal" and "messages from my body," were unclear to many. At other times, the entire question was found to be vague. For example, 13 subjects were unable to understand the item, "When solving a problem my thinking is not directed by the type of problem I have" (#48). Twelve subjects were not able to answer question #14, "How I think through a problem is influenced by the type of problem I have," or question #32, "Other aspects of my life do not fit in with things I do to take care of myself." At best, in two sub-scales, 88% and 85% of the sample were able to complete all items.

Accuracy. When subjects encountered items they clearly understood, they often had difficulty selecting a response that accurately reflected their ability to take care of themselves. For example, some respondents had difficulty choosing a response to items such as "I can make my body and limbs move in order to care for myself." When their legs were stiff or not functional and their upper body was fine, none of the response categories accurately described their situation. Other items were problematic in that they did not allow subjects to take into consideration factors they believed to be important in influencing their ability to take care of themselves. For example, in response to the statement, "I cannot do all my self-care because I don't have enough skills," several respondents indicated that it was not their level of skill but rather their disability (e.g., arthritis) that prevented them from doing their self-care. They believed they had the necessary abilities or skills but could not use them. The different approaches subjects took to handling these items served to distort further this measure of self-care agency.

The accuracy of the PSCAQ was also threatened by the occurrence of double-negatives in reversed items. Determining an appropriate response to these items when subjects believed the opposite to be true was extremely difficulty for most.

Administration. Reviewing response categories for each item proved to be an unwieldy repetitive and awkward task for both subject and interviewer. It was noted that a majority of respondents found it easier to remember and use the response categories if they were shortened to just one word, for example, "sometimes" instead of "sometimes like me." This facilitated memorization of response categories and also provided a more appropriate response to items framed in the first person, as found in this questionnaire.

Subjects' opinions of the PSCAQ. Opinions expressed about the questionnaire suggested that polite subjects thought it was "thorough," "not too personal" and "useful" (n=7) but that it was hard to understand (n=9). Six of the 27 respondents thought that the questionnaire was too long. The other 21 respondents believed the length to be "about right". One subject indicated it

was necessary to have a questionnaire of this length to "get at the problem deeper". Another suggested that the length of the questionnaire was not a problem because he had "lots of time". Respondents took 20 to 60 minutes to complete the questionnaire. For many subjects, a longer administration time was necessary because they requested that items be repeated several times as they struggled to understand them. Periodic rests from answering the questions were also taken to recount events related to their own self-care with the researcher. A few subjects made specific suggestions for ways the questionnaire could be improved. One subject commented that it was necessary to "clear up the language." Another believed the questionnaire could be improved by asking "less questions more clearly."

In summary, major problems in relation to comprehensibility, accuracy and adminstration have been identified when the PSCAQ is used with those older adults in nursing homes who are interested in and able to describe their perceptions of their ability to care for themselves. These problems pose a serious threat to both reliability and validity, suggesting that the PSCAQ, in its present form, has limited use as an instrument to measure the self-care agency of older adults.

Discussion

The results of the pilot study indicate that the PSCAQ is not appropriate for use with older adults and does not provide a useful basis for development of an instrument to obtain subjective assessments of self-care agency with older adults. Although some of the items provided a stimulus for discussion of individuals' perceptions of their ability to care for themselves, the majority of the items did not. In these instances, respondents spent time guessing what the item meant or trying to determine a response that described their situation (when none of them did), rather than providing the interviewer with information about their ability to care for themselves.

The problems related to instrument clarity identified in this pilot study are not new and are commonly referred to in discussion on development of self-report measures. The question that should be asked is why do these problems keep reoccurring. Although the educational background of subjects in this pilot study ranged from those having little formal education to those with post-secondary education none were ignorant about what it meant to be able to take care of themselves. However, use of technical words and professional jargon, poorly constructed items and inappropriate response categories reduced respondents' ability to interpret items, rendering the instrument irrelevant for the majority of this group. The practice of using nurse experts as the sole evaluators for content validation contributes to this problem and should be questioned. While experts can make important judgements on the suitability of the content, as well as the structure of the items or test, it is

clear from this pilot study that respondents themselves can provide invaluable information on the technical quality of items that was overlooked by professional experts. Although the PSCAQ was tested with adults, including some from senior citizen groups (Hanson & Bickel, 1985), these problems were not identified. It is likely that many of the problems encountered by the sample in this pilot study in completing the PSCAQ would be experienced by other respondents, including younger adults.

Since completion of this pilot study, results of an additional evaluation of the PSCAQ have been published by Weaver (1987). He concluded that observed measurement discrepancies reflected in estimates of reliability and validity may have resulted from problems inherent in the measuring tool itself. Weaver notes, for example, that some of the PSCAQ items encompass two or more abilities which may contribute to confusion and response inconsistency. However, as in the case of Bickel and Hanson (1985), Weaver did not observe test performance and therefore, missed some important data that could have been used to explain the results of this evaluation.

Researchers who develop and evaluate instruments without requesting feedback from respondents, or who do not observe performance while subjects complete the test, fail to gather important information that has direct implications for the reliability and validity of the instrument. Dialogue with respondents both during and following completion of the PSCAQ, combined with observations of test performance, proved to be effective and necessary strategies for eliciting information with regard to the appropriateness of this instrument for this population.

The difficulty many participants experienced interpreting and responding to questions may also be related to the way the PSCAQ was constructed. In this case, the PSCAQ was developed deductively with items being derived from a theoretical framework (Orem, 1985) that is still largely untested. While it is recognized that self-care ability varies over the life cycle, as do demands for self-care, the contribution of age or stage of development to self-care agency remains relatively unexplored. Attempts to describe a self-care model of nursing for the elderly that recognizes the unique demands for self-care that are associated with aging, such as the work of Sullivan and Munroe (1986), are, therefore, important. However, to identify and describe age-specific power components of self-care agency fully for this population, use of inductive descriptive research approaches may be necessary. For example, Golander's (1987) use of participant observation techniques in a nursing home has revealed some important findings related to the dynamic role disabled adults engage in as they adjust to caring for themselves in nursing home environments. On the basis of this kind of understanding, theory related to self-care agency can be refined, and more appropriate and accurate measures of self-care agency for this group could be developed.

Researchers should be alert to measurement problems that threaten the reliability and validity of the instruments they are using. Feedback from respondents can provide important information about the comprehensibility of the instrument and its appropriateness for use with a particular population or setting. In addition to the usual practice of administering an instrument in accordance with its intended use, face-to-face dialogue with at least some of the respondents should take place. Observations of some respondents while completing the instrument should also be included. Findings from pilot studies that are designed to collect this kind of information can be used to facilitate the development of measurement instruments at the time of construction, as well as when the instrument is being considered for use with different populations and settings.

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RÉSUMÉ

Evaluation d'un instrument dans une étude pilote: Le questionnaire des auto-soignés

Les chercheurs doivent être très alertes aux problèmes qui menacent la fiabilité et la validité des instruments dont ils se servent. Même si la fiabilité et la validité d'un instrument ont été établis, il ne faut pas assumer pour cela que ses propriétés seront valables pour chaque situation et pour chaque sujet. La contribution d'une étude pilote dans l'évaluation de l'utilité de mesures existantes pour la cueillette de données dans d'autres situations et avec d'autres populations est illustrée dans une discussion de l'expérience de l'auteur même dans le pilotage d'un instrument conçu pour mesurer les auto-soins. Les renseignements obtenus des répondants se sont avérés contenir des informations importantes sur la compréhensibilité de l'instrument et la justesse de son emploi pour les adultes âgés, ce qui avait été négligé par les experts professionnels. La discussion porte sur l'importance d'inclure des dialogues en tête-à-tête avec au moins une partie des participants, ainsi que des observations sur la performance des tests dans les études pilotes conçues pour évaluer les instruments de mesure des auto-rapports.