



Why do we need Tools in Nursing Research?

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In this editorial we address the question of why we need tools in nursing research by starting with a brief history of nursing as a science and the role of nursing theories, then moving to a discussion of data sources for measurement tools, measurement theory, and special issues to consider surrounding tool development.

A brief history of nursing as a science. As a science, nursing deals with human responses health and deviations from it, prevention of disease, and caring for individuals and communities experiencing acute and chronic conditions. As a profession, nursing has a mandate to provide services to society that optimize health and well-being. In order to do so, the conduct of research to generate new knowledge on an ongoing basis has been deemed an important responsibility of the professions, and nursing has taken this mandate seriously.

However, in the middle of the 20th century, few nurses were qualified to conduct research, and the phrase “nursing science” had not been framed yet. Only two institutions of higher learning were offering programs for nurses seeking advanced degrees at the doctorate level: Teachers College–Columbia University and New York University. Both emphasized preparing graduates in nursing education. Both the move of basic preparation to colleges and universities, and the development of graduate education were slow; by the mid-1960’s there were only six institutions offering

doctoral preparation in nursing, with five of them in private universities. However, in the ensuing three decades nursing education made rapid progress in expanding the number of educational programs resulting in the increase in the number of nurses with advanced degrees; concomitantly, the science for the discipline of nursing was expanding. There were many salutary factors contributing to this favorable state of affairs, a major one was and continues to be the engagement of the Federal government on two fronts: first, by supporting nursing education and advanced training opportunities for many, through the Division of Nursing, which is part of the Department of Health and Human Services; secondly, through the creation of the National Institute of Nursing Research within the National Institutes of Health in the late 1980’s, during which research and research training support expanded dramatically.

The role of nursing theories. Measurement of abstract concepts has occupied the attention of many nurse scientists along with concepts that are more concrete and observable. The work carried out by nurse scientists in this area accounts as one of the important factors that has contributed to the rapid development of nursing science. The research and the instruments used need to be grounded in a theoretical framework, so that the investigator can interpret results embedded in that theory, thus enabling discussion of the ways in which the substantive

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hypotheses derived from that theory using that tool are supported or refuted, lending support for the theory, or suggesting revisions or new directions to be taken; in this manner, the area of practice to which the theory relates can be clarified and elucidated, eventually providing guidance for nursing interventions.

In order to conduct research, ways to identify concepts and measure them are needed, which is why measurement tools are developed, tested, and used. In nursing, the emphasis on measurement tools can be demonstrated by periodic publications that are compilations of measuring instruments that appear decades apart. In these volumes available tools are classified, reviewed, and evaluated. For example, in one such volume the author/editor classified the tools under those assessing health and function (examples: measuring mental status, coping, quality of life, self-care activities), and those assessing clinical problems (examples: nausea and vomiting, alterations in taste and smell, skin integrity, dyspnea).¹ Over time there has been an increase in the number of tools available, as the number of concepts of interest to nursing science has proliferated. The utility of measurement tools has been enhanced by concomitant advances in statistical techniques, so that uses of progressively more advanced analytic procedures can be noted.

Data sources for tool development. Generally, tool development endeavors, just like research, can be characterized as being qualitative or quantitative in nature. Quantitative measurement tools enable examination of phenomena as characterized by variables through their description, relationships and causality between and among them; such research/tools require control and use of quantitative data such as those derived from structured questionnaires or physiologic measures. “Alternatively, qualitative measurement tools deal with exploration of meaning; both inductive and deductive reasoning may be employed.”² (p. 26). In either case however, the research question dictates the choice of research strategy and instruments to be used.

There may be occasions when a combination of both research strategies can yield richer data than one approach used singly. An example may be quality of life as a concept. A quality of life scale may be structured in such a way as to yield data that can be treated via quantitative analyses, such as obtaining objective information on areas of a person’s life, including health, career status, education, personal/family life and relationships, income, and the like; yet asking a patient to describe how they experiences their own quality of life may reveal a different picture than what objective measures reveal. The use of a qualitative approach may reveal that a patient may experience a poor quality of life while at the same time objective data observed by an outsider on various dimensions of quality of life may show a good quality. In such instances both quantitative as well as qualitative data may need to be generated, and both types of data may need to be analyzed and reported to provide a deeper understanding of the concept “quality of life.” The combination or “mixing” of quantitative and qualitative data is thought to generate richer information on the population studied than when only objective data is studied, and is recommended where feasible. This manner of combining two different research strategies is referred to as mixed methods and is achieved through the process of triangulation. In cases where there is more than one instrument, care needs to be taken to choose the one that best fits the goals of the research project. When this kind of combination is used it is important that both tools—for the qualitative and quantitative aspects of the concepts – have the same theoretical underpinning in order to have a coherent outcome.

The role of measurement theory. Whether they are quantitative or qualitative in origin, instruments need to adhere to two principles of measurement theory: reliability and validity. Reliability means that an instrument measures the variable of interest in a consistent manner, and validity means that the tool measures what it purports

to measure. Yet, this way of putting things hides major complexities. For example, an instrument may be valid and/or reliable for a certain age group but not for others; other variations may be present across situations in which the measurement occurs, such as experiences of subjects, their health status, culture in which individuals reside and other factors. Thus, investigators need to specify for whom the instrument is intended, and types of subjects and settings with which the psychometric testing was conducted. Psychometric testing should be conducted if the instrument is to be used with a different group than it was tested on, because the population of interest and/or context will affect the instrument's validity and possibly reliability. It can be seen that developing and refining an instrument might occupy an investigator for many years. Thus, it can be an iterative process; as well, given rapid scientific and societal changes, what may have been a valid and reliable measure 10, 20 or 30 years earlier may no longer be so, and therefore, may need to undergo revisions.

Tool Development issues. Developing an instrument is an arduous and time-consuming process, sometimes lasting many years to accomplish or bring to a reasonable level of scientific rigor. There has been a tendency on the part of nurse investigators, especially graduate students completing research projects for their degrees, to develop an instrument, doing minimal validity and reliability testing, and using it to complete their degree requirements. Typically, such instruments are forgotten, and lost to science unless the author continues work on it following completion of degree requirements. Some institutions now allow development of tools as an appropriate topic for dissertations, other institutions do not. After spending extensive time and effort on a tool development project the investigator has a responsibility to publish it so that the information is widely disseminated. This is important to nursing on a worldwide basis, as it will enable everyone to benefit from the work – a consideration that is critical for low-resourced settings.

The developer of the instrument needs to be clear on the type of data that will be generated and clearly state the level of measurement, how data will be coded, scored, analyzed and interpreted. Whether developing an instrument or evaluating an existing one for use, one needs to consider methods of administration, scoring and skill level needed in administering it, as these have implications for training needed, and cost and time commitments on the part of the investigator. Prior to undertaking instrument development it is important to examine existing instruments and evaluate their utility for the current needs; note that any changes made in an existing instrument will affect its validity and reliability.

Instrument translation. Investigators in many parts of the world interested in studying phenomena of interest to nursing may want to make use of tools developed in another language so they can benefit from existing scientific work. This may lead to translation from one language to another. However, this is not a simple task; cultural issues are likely to be encountered, as well as variations in institutional practices and values. Regardless, once translated, in order to ascertain that a tool is faithful to the original, a back-translation to the original language is recommended. After these steps, and any revisions that may be indicated, reliability and validity testing need to be conducted on the population and language in which it will be used. Once these are attained satisfactorily, the tool can be used in the projected study.

In summary, we need tools in nursing research because tool development is of critical importance to the ongoing evolution of nursing science. As nursing continues to evolve and grow as a discipline, the tools that we use to measure concepts of interest to nursing must likewise evolve through ongoing exploration and refinement. A historical context helps to demonstrate that tool development is an ongoing process, similar to the ongoing growth of nursing science; thus, we should never assume that a measurement tool, once

developed, is immutable. Recent advances in research methods allow us to explore various sources of data, to tool development efforts. Measurement theory provides the foundation for all tool development endeavors, while various tool development issues, including instrument translation, help to expand the global influence of nursing through its tools and the collegiality of nurse scientists worldwide.

References

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