These investigators describe the characteristics of nurse anesthesia research reported in the AANA Journal in 1975-1976 and 1985-1986 and compare nurse anesthesia research to overall nursing research as reported by Brown, Tanner and Padrick. The amount of nurse anesthesia research remained stable, with an even greater focus on clinical practice than in nursing research overall. The 1980’s research, as in all nursing, was more theoretically oriented than the 1970’s studies.

Nurse anesthesia research designs were mainly descriptive, with a trend toward explanatory and prospective. As in all nursing research, convenience samples of hospitalized individuals were most common. More pronounced in nurse anesthesia research than in nursing overall were deficiencies in reporting of reliability and validity of data, psychometric evaluation of instruments and use of statistics. Trends toward CRNA authorship and addressing ethical concerns were identified. Recommendations included increased emphasis on methodological studies, conceptual links and statistical analysis; extension to topics of nursing education and administration and characteristics of nurses; and replication of studies.

**Introduction**

The impact of research on the practice of the certified registered nurse anesthetist (CRNA) is an especially relevant topic. Twenty-five years ago the vast majority of nurse practitioners and educators functioned without consideration for research or publication of their ideas. In more recent times, there has been considerable debate as to the propriety of nurses being involved in research at all. Nurse anesthesia is at a decisive phase in its professional evolution, with increased emphasis upon clinical excellence, graduate education and, most recently, scholarly research. Establishing the scientific base for practice is a critical factor in the maturation of the specialty, as well as an essential element in identifying and testing practice innovations.

Brown, Tanner and Padrick have proposed that four characteristics of research are essential for development of a scientific knowledge base for a practice discipline. Research should be conducted by members of the discipline, focused on clinical problems and based in a conceptual framework. In addition, the methods must be sound. Brown and associates have described nursing research over three decades in terms of those characteristics, identifying trends and changes.

In this article, the authors report findings from a study of nurse anesthesia research conducted in the 1970s and 1980s. Its purpose is twofold — to make comparisons between the two decades and to place nurse anesthesia research within the broader context of nursing research in terms of the characteristics proposed by Brown and associates. Several specific questions are examined: What were the foci of nurse anesthesia research? How was the theory reflected in nurse anesthesia research? What research
methods were nurse anesthetists using? What were the qualifications of the first author of nurse anesthesia research reports? What were the similarities and differences between nurse anesthesia research and nursing research?

**Materials and methods**

The sample for this qualitative study was composed of 32 complete research reports published in the 1975 (n = 8), 1976 (n = 6), 1985 (n = 11) and 1986 (n = 7) issues of the *AANA Journal*. These years were selected in order to provide a reasonable description of nurse anesthesia research and for comparison with trends in nursing research. The research abstracts published by the *AANA Journal* were excluded because of insufficient detail.

Categories were developed to facilitate classification of the research. Because it was designed specifically to fit the present study, the validity of the set of categories depended upon its representation of four essential characteristics of research. The categories included information on the type and purpose of the research, the use of a conceptual framework or research question(s) and specific research methods.

Judgments regarding the presence of a theoretical orientation were liberal, taking into account both implicit and explicit conceptual frameworks. Brown considered a discussion of results in terms of past or future research, a review of literature or the presence of a conceptual perspective as indicative of a theoretical base. Examples of a conceptual perspective included a narrative exploration of the proposed relationship among the study variables or a diagram depicting those relationships. Terms such as conceptual approach, conceptual framework and conceptual model were used synonymously.

Several categories were used to describe the research methods, addressing design, sampling, reliability, validity and statistics. In addition, the presence or absence of information about ethical issues was noted; for example, reporting review for protection of human rights. The categories were discussed, tested and revised until all the investigators interpreted them consistently. Additional information about the categories and classification procedures can be obtained from the authors.

Several steps were taken to assure intercoder reliability. Initially, 25% of the sample articles were analyzed simultaneously by two investigators. Discrepancies were discussed and resolved until 90% agreement was obtained across categories, after which each of the remaining articles was analyzed independently by an investigator. For each of the 32 reports, the classification on every category was reviewed for potential error by a single investigator, and discrepancies again were resolved by mutual discussion and agreement among all investigators.

Frequencies and percentages were used to summarize the data across categories. Findings for 1975 and 1976 were compared with those for 1985 and 1986. Results from this study of nurse anesthesia research were also compared to findings of Brown and colleagues about the characteristics of nursing research in the 1970s and the trends they projected for the 1980s.

**Results and discussion**

The 32 research reports identified constituted 26% of the articles published in the *AANA Journal* during the designated years. Although the number of studies reported increased by 29%, from 14 in 1975-1976 to 18 in 1985-1986, the proportion of total articles did not change. The *AANA Journal* has not restricted the number of research articles (personal communication, Chuck Biddle, CRNA, MS, *AANA Journal* Editorial Consultant, May 1988), so the increase in the number of research reports was interpreted as a crude indication of change in the volume of research.

**Focus of research**

In the sample, researchers consistently focused on nurse anesthesia practice. In the 1975-1976 issues, 86% of the studies were clinically oriented, whereas in the 1985-1986 issues, 78% were clinically oriented. Four major themes were identified: (1) evaluation of specific anesthetics, (2) evaluation of new technology, (3) evaluation of specific anesthetic agents in patients with specific medical diagnoses and (4) characteristics of nurse anesthetists. No clear trend toward any particular theme emerged over the decade. In studying the characteristics of nurse anesthetists, researchers did shift from an emphasis on market analysis to an emphasis on the stressors and learning styles of the nurse anesthetist and nurse anesthesia student.

Brown and associates classified nursing studies into four general groups: nursing education, nurse characteristics, administration and clinical practice. They found that more than 60% of nursing research was focused on clinical problems and reported that the number of clinical studies had increased over the past three decades. In the 1980s, federal agencies and other organizations that fund research have given priority to clinical research and, therefore, the proportion of nursing studies in that category would be higher today. The stable clinical focus of nurse anesthesia research has been an important factor in the development of the scientific knowledge base of the discipline.
Conceptual base of research

The presence of a literature review, conceptual perspective, discussion of results in terms of past research and suggestions for future research all were viewed as indicators of theoretical orientation. In 1975-1976, investigators reported one or more of those elements in 53% of the nurse anesthesia studies, and there was an increase to 61% in 1985-1986. It is important to note that the respective theoretical orientation was not evaluated in detail. The number of studies with interpretations linked to a theoretical orientation doubled between the 1970s and the 1980s. Furthermore, compared with the 1970s, twice as many studies in the 1980s included research questions. Based on these findings, it was concluded that nurse anesthesia research has become more theoretically oriented. This conclusion was consistent with the report of Brown and associates that nursing research has become more theoretically oriented.1

Research methods

How have methods in nurse anesthesia research changed over the past decade? To discover the answer to this question, design, sampling, measures and statistical analysis were examined.

Design. The articles were classified according to their purpose—methodological, explanatory or descriptive. Methodological studies were concerned with the development and testing of instruments or procedures. Explanatory studies were either correlational or experimental in nature, and descriptive studies were intended to determine the characteristics of some phenomenon. One study in the sample dealt with the evaluation of equipment. Investigators in 69% of the nurse anesthesia studies cited description as their goal, compared with explanation in 31%. By comparison, Brown found that 14% of the nursing studies were methodological, 35% descriptive and 51% explanatory.

Of the total sample, 53% were case studies, 31% were experimental and 9% were surveys. One (3%) was related to procedure, and another was a market analysis for anesthesia services. Brown and associates did not provide similar detail in their article. It was interesting to note, however, that they reported case studies as very rare (1 of 137 studies).

The number of experimental studies more than doubled over the decade, with seven (21%) reported in 1985-1986. Brown did not find a similar shift toward experimental explanatory studies. There was a trend toward stating a research hypothesis or question in the nurse anesthesia studies, which increased from 19% in the 1970s to more than 40% in the 1980s.

Of the total sample, 66% represented prospective studies. Except for one (3%) cross-sectional study, the remainder were retrospective. In 1975-1976 there were slightly more retrospective than prospective studies, but by the mid-1980s there were more than twice as many prospective as retrospective studies.

Sampling. Individuals comprised the sampling unit in 94% of all studies. The sample size ranged from one to more than 1,000, with 25% of the studies having a sample size of one. Forty-five percent of the studies had a sample size under 30, 28% had a sample size between 30 and 60, and 27% had a sample size greater than 60. There was a shift toward the use of smaller samples over the 10-year period. The median sample size was 105 in 1975-1976 (range = 1-1,500) and 19 in 1985-1986 (range = 1-300). The settings in which the data were gathered were mainly hospitals.

None of the researchers sampled organizations or families. Response or participation rates were unreported in 91% of the studies. Sixty-nine percent of the studies included convenience samples. Investigators tended to select relatively small nonprobability samples, which may be attributed to the clinical nature of the research. Researchers used randomly selected subjects in 9% of the studies.

According to Brown, individuals comprised the sampling unit in 90% of the nursing studies. They limited reporting of specific statistics about sample size to a median of 64 in 1970 and 60 in 1980. The settings for data collection also were mainly hospitals. None of the general nursing researchers sampled families, but a few sampled events or organizations. As with nurse anesthesia, a majority of the studies had convenience sampling.

Sources of data. The sources of data used in nurse anesthesia research are indicated in Table I.

Brown and associates reported that nurses mainly have used questionnaires and interview schedules to collect data, and they found little change over

| Table I |
| Sources of data utilized in AANA Journal research reports |
|----------------|----------|----------|
| Questionnaire  | 9%       | 6%       |
| Patient record | 22%      | 6%       |
| Observation    | 19%      | 22%      |
| Interview      | 9%       | 9%       |
| Physiological measure | 28% | 47% |
| Other          | 13%      | 10%      |
| Total          | 100%     | 100%     |

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three decades. Among the AANA studies, 75% included physiological measures, with retrospective review of patient records being the second most frequent source of data. Researchers did not report on the validity or reliability of their data. Intrarater reliability was assessed in one study, but there were several others in which such information would have been important. Brown and associates indicated that authors described the reliability of their data in 48% of the 1980s nursing studies and reported on the validity in 33%, but they noted the lack of psychometric evaluation of measures as an issue of concern.1

Statistical analysis. The statistics used were primarily descriptive, mainly mean, median and mode; however, 34% of the nurse anesthesia studies did not include the use of any statistic. The use of advanced statistics (e.g., MANOVA or multiple regression) was noted in three studies, two of which were from the 1980s. By contrast, Brown reported that statistical tests had become the norm in nursing studies, as advanced statistics began to appear in the literature.1

Ethical issues. Information about ethical issues was included in only four nurse anesthesia studies, three of which were done in the 1980s. Therefore, the start of a trend toward addressing ethical issues in research reports could be inferred. Brown did not address ethical considerations.

Qualifications of first authors

With regard to the highest degree held by first authors among the total sample, 19% of those in the sample held a diploma or associate degree, 22% a baccalaureate degree, 28% a master's degree, 12.5% a doctor of medicine degree and 12.5% some other type of doctoral degree. The number of authors with masters' degrees increased from 3% in the 1970s to 25% in the 1980s. Most of the 1975-1976 studies were conducted by CRNAs, with 57% (n = 8) of first authors being CRNAs, 29% (n = 4) MDs, 7% (n = 1) PhDs but not CRNAs and 7% (n = 1) corporate contributors. All of the 1985-1986 first authors (n = 18) were CRNAs. These findings support movement toward a higher educational level among CRNA authors and away from physicians as first authors.

Conclusion

The proportion of research reports among AANA Journal articles has remained stable over the past decade, although there was a small increase in the number of studies reported. The focus of this research has been on clinical problems, with most of the research conducted by CRNAs. Themes of research remained constant. Nurse anesthesia research has become more theoretically oriented. In comparing the 1970s with the 1980s, a modest increase in studies with a conceptual framework was noted, and investigators included research question(s) and linked interpretations to previous research and a conceptual framework in twice as many studies.

Research methods have been stable over the past decade. While most studies were descriptive, a growing number had a prospective design. Over the decade, the studies involved smaller samples and focused mainly on hospital settings. The most commonly used measures were physiological, and their use expanded substantially in the 1980s. Reports of the psychometric properties of measures continued to be lacking, and statistical analysis remained mainly descriptive in nature. Research could have been linked clearly to prior work and included plans to refine or refute the current theory.

Certain limitations are evident in both nurse anesthesia and general nursing research. The impact of nursing education, nursing administration and nurse characteristics on the quality of patient care has not been explored. More methodological studies are needed to facilitate explanatory research and to support the technical aspects of nursing practice.

In view of the clinical focus of the nurse anesthesia research, replication is extremely important. The use of advanced statistics would allow for an examination of the interrelationships among variables of interest. Facts, principles and methods for nursing interventions are established through replication and extension of theoretically based studies. Research findings that have been replicated with carefully controlled methods in a variety of settings have become more generalizable. Nurse anesthetists can apply such knowledge in their practice with increased confidence.

REFERENCE


AUTHORS

Roma Lee Taunton, RN, PhD, is associate professor for research, University of Kansas Medical Center School of Nursing, Kansas City, Kansas. Dr. Taunton holds a BSN degree from the University of Alabama, an MN degree from Emory University and a PhD degree in Educational Psychology and Research from the University of Kansas.

Sharon Oetker-Black, RN, PhD, is assistant professor, Kent State University, School of Nursing, Kent, Ohio. Dr. Black holds a BSN degree from Kent State University, an MSN degree from the University of Arkansas and a PhD degree in Nursing from the University of Kansas.

Cynthia Q. Woods, RN, PhD, is research assistant professor, University of Kansas Medical Center School of Nursing. Dr. Woods holds a BSN degree from the University of Kansas, an MS degree from Boston University School of Nursing and a PhD degree in Nursing from the University of Kansas. She was formerly assistant vice-president for nursing, Newton-Wellesley Hospital, Newton, Massachusetts.