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In My Opinion

# Appropriate Use of Statistical Analysis in DNP Projects

Staci Reynolds, Julee B. Waldrop, Jayne Jennings Dunlap

Many nurses and nurse practitioners (NPs) are earning the doctor of nursing practice (DNP) degree. With more than 700 DNP programs in the country, a program to pursue this degree is not hard to find.[1] However, the distinction between the skill sets of the DNP- and the PhD-prepared nurse continues to be unclear: DNP programs prepare nurses to be experts in evidence-based practice quality improvement (EBPQI), whereas PhD programs prepare nurses to be experts in nursing research. Together we have more than 50 years in graduate education experience and most recently in DNP education, and a concerning aspect we are seeing in DNP education is that there is an overemphasis on the use of statistical tests to obtain *P* values, which should be used to evaluate data obtained from research studies conducted by nurses prepared with a PhD, and a lack of emphasis on using quality improvement (QI) methodologies, which should be used by nurses prepared with a DNP. Yet many DNP programs continue to stress the inappropriate use of statistical tests to evaluate data collected for QI projects; this may be because DNP courses are being taught by PhD-prepared nurses. Nurses in advanced practice roles, such as NPs, should be able to measure processes and outcomes of evidence-based clinical decisions and participate in the generation of external evidence; however, this should be done using QI methods rather than research.[2]

QI is a separate type of inquiry in which data should almost exclusively be evaluated through the use of run charts or statistical process control charts to identify signals of improvement or special cause variation, respectively.[3,4] This erroneous emphasis on statistical significance takes away from proper focus on clinical and practical significance, essential to the meaningful translation of a critically appraised body of evidence into practice[5] before the use of QI methods, as found in EBPQI initiatives. DNP projects are not research studies, and therefore they should not require the use of statistical tests or associated power analyses. DNP programs should be preparing graduates that are knowledgeable about statistical tests so that they have an understanding of methods and results as they critically appraise evidence to translate into practice; however, it is our belief that they do not need to understand *how* to conduct statistical tests because they have not been trained to conduct research. As such, completing only a single statistics course, as noted by Kuerban,[6] may be sufficient. Some DNP programs may dedicate course work to having students learn how to conduct statistical tests using software packages such as SPSS, but students may end up not using these programs to evaluate data from their own DNP projects. It may be a better use of time to teach students how to be proficient in programs such as Microsoft Excel, where they can create run charts and statistical process control charts.

DNP programs should improve education around the design and analysis for QI and EBPQI projects. DNP programs do not need to heavily teach statistics; rather, there should be more emphasis on how to use QI methods appropriately, including run charts and statistical process control charts for analysis instead of research methods, such as logistic regression, analysis of covariance, *t*-tests, or chi-square tests. Further, more emphasis should be placed on how to translate evidence into practice effectively by using methods such as evidence-based implementation strategies. As noted in a recent editorial, many manuscripts submitted to clinical journals, which are often DNP projects, inappropriately use research statistical methods to evaluate data from QI projects.[7] This mixing of research and QI terminology further perpetuates confusion with the 2 types of inquiry and the competencies for which DNP graduates are prepared.[8] Many DNP projects deal with small populations in which inferential statistics are not appropriate. In addition to run charts or statistical process control charts, if the sample size is appropriate and the assumptions are met, a parametric or nonparametric test may be appropriate, although this is not required to determine practice improvements. This issue is highlighted in the article "Misuse of the *P* value: Using Quality Improvement Analyses to Identify Clinically Significant Improvements,"[9] which compares the differences in the use of statistical tests, which are research focused, to the use of run charts/statistical process control charts used in QI, showing that inappropriately using statistical analyses can mask clinically important findings that are more likely to be identified using appropriate QI evaluation methods.

The use of limited or incorrect statistical methods in DNP projects may mean that the contributions to practice of these DNP projects may be limited, undermining the potential value of the DNP degree.[10] If DNP students are taught (and in some instances, required) to use statistical tests that should be reserved for research to evaluate their QI projects, this impedes future and current NPs' ability to translate evidence into practice and ultimately undermines the purpose and value of the DNP degree. Indeed, there is much confusion from health care leaders who do not understand the value or role of the DNP-prepared nurse.[11-13] Providing improper training to DNP students regarding how to evaluate their projects adds to this unfortunate confusion.

Until faculty teaching in DNP programs understand the unique differences between research and QI methodologies, we will continue to be stymied as a profession. As such, it is imperative for both DNP- and PhD-prepared faculty to be educated and

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understand the role of the DNP-prepared nurse and how they are to be experts in EBPQI rather than research. If faculty members do not fully understand how QI projects should be evaluated, how are we to expect that students, stakeholders, and leaders will? There is a significant need for a paradigm shift in DNP programs because we have lost our way. Instead of developing true experts in EBP and QI methods or EBPQI,[14] we are providing "PhD-lite" education—a true disservice to students, the public at large, and the profession.

## CRediT authorship contribution statement

**Staci Reynolds:** Writing – original draft, Conceptualization. **Julee B. Waldrop:** Writing – review & editing, Conceptualization. **Jayne Jennings Dunlap:** Writing – review & editing, Conceptualization.

## Declaration of Competing Interest

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Staci S. Reynolds, PhD, RN, ACNS-BC, CPHQ, FAAN, is a clinical professor, Duke University School or Nursing, Durham, NC, and can be reached at staci.reynolds@duke.edu. Julee B. Waldrop, DNP, FNP-C, PNP-C, CNE, EBP-C, NC-BC, FAANP, FAAN is a Clinical Professor Emeritus, University of North Carolina Chapel Hill, Chapel Hill, NC and a Consulting Associate, Duke University School of Nursing, Durham, NC. Jayne Jennings Dunlap, DNP, APRN, FNP-C, CNE, EBP-C, FAANP is the DNP Program Director and an Associate Clinical Professor, Texas Woman's University, Houston, TX.