

Susan J. Henly, PhD, RN

Associate Professor

University of Minnesota

School of Nursing

henly003@tc.umn.edu

Nursing, Statistics, and a Tradition of Humanitarian Science

Nursing and statistics? At first blush, it may seem like an unusual combination. Yet, statistics has played a pivotal role in the development of nursing science for improved patient care ever since the Nightingale era.

Florence Nightingale has universal recognition as the founder of the profession of nursing. She earned the title "The Lady with the Lamp" when she single-handedly and compassionately directed changes in the care of British soldiers in the Crimea; a remarkable decrease in the death rate followed. Nightingale compiled data and later used it as ammunition to argue for lasting reforms to protect the health of soldiers and care for them when they were wounded. In fact, she used statistics with a religious intensity in all her work. She was convinced of its absolute necessity for understanding health issues. As a pioneer in the graphical presentation of data, Nightingale was also an inventor of statistics. In all her statistical work, she was motivated by a desire to improve health and the conditions for health.

Today, I am a university professor. In that position, I'm both a nurse-scientist and a quantitative methodologist. My nursing career began somewhat by chance, with an unexpected opportunity for a part-time job as a nurse aide during high school. I found satisfaction working with the very debilitated elderly people I cared for, but was also shocked at the reality of their physical decline and challenged to consider new ways to improve their comfort and everyday functioning. I decided to major in nursing in college. This decision derailed an earlier plan to consider a career in mathematics, and for many years I wondered whether I would ever "use" the high school math courses (5 years worth) that I had enjoyed so much.

Looking back, I can see that my interests in math alerted me to potential connections with quantitative methods during my nursing education and during my clinical practice years. Measurement problems were especially fascinating. I recall one lecture in nursing fundamentals when my professor talked about the need for nurses to provide just the right "dose of empathy" to motivate patients to walk the first time after abdominal surgery. As a staff nurse in the birthing unit and intensive care nursery, I wondered about mothers' reactions to their newborns, and whether the actions that nurses took actually helped or hindered the development of a mother's attachment to her infant. Without a way to measure attachment, it was hard to say.

My return to the university after 7 years of clinical nursing gave me an opportunity to reclaim my interest in mathematics and redirect my career in nursing. During my master's

program in nursing, I served as a research assistant on a project studying nursing staff turnover in newborn intensive care units. I learned first-hand about measurement and statistics problems in contemporary nursing research, and was directed toward beginning formal study of these matters in psychology (psychometric methods) and statistics. My thesis research (studying the impact of respirator support, position, maturity, and intensity of caregiving on the quality of sleep of infants receiving intensive care) gave me a chance to apply the new statistical techniques I was learning about in class.

I stepped aside from nursing during the 8 years of my doctoral program in psychometric methods. In preparation for conducting my own research in psychometrics, I studied (calculus, theoretical and applied statistics, measurement, and some psychology) and worked with my advisor (Dr. Robert Cudeck) on his research projects. The technical problems in covariance structures analysis that I investigated are important to many nursing research problems today. In addition, findings from my dissertation research will serve as a statistical foundation for an applied measurement problem that I am working on: development of a valid and precise instrument to measure mother-to-baby bonding. A pre-doctoral fellowship from The National Institute of Nursing Research at the NIH provided financial support for my Ph.D. program (tuition, research supplies, and stipend) for 5 years.

Today, I am often called upon to advise other nurse-scientists about measurement and statistics. Some of the problems include: how to determine the most reliable way to measure wounds, explaining nurses' hand-washing behavior, evaluating the effectiveness of massage in enhancing recovery from open heart surgery, and understanding women's breast-feeding behaviors. When I consult with nurse-scientists and other researchers, I draw on both my clinical experience in nursing and my formal preparation in measurement and statistics. The clinical experience gives me insight into the research questions and helps to establish rapport with persons asking for my advice. My quantitative training gives me the knowledge and information needed to answer questions about research design, measurement of variables, and analysis of data.

As a young girl, I read Nightingale's biography and knew of her actions - her direct care of sick soldiers in the Crimea, her effort to convince policy makers and the military hierarchy (all men!) of the need for changes in military health care, and her successful launching of nursing as a respected profession. Only as my hybrid career as a nurse-scientist and quantitative methodologist developed have I become aware of her statistical work, and the esteem in which she is held by statisticians. She is a real heroine to me, as I follow in her footsteps to improve the care of individuals, families, and communities with strong and useful statistical techniques for nursing research.