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Editorial

The voice of nurses in hospital epidemiology and infection control: An example from the 19th century



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Unsurprisingly, over the last 200 years, the accumulation of research and technologies considerably improved nursing sciences. Despite this ever-changing landscape, there are still some core pillars advocated by past pioneers in nursing, hospital epidemiology and infection prevention and control (IPC) that have withstood the test of time and remain at the center of current clinical practice. The International Nurses Day this 12th of May will be the occasion to celebrate the 200th birthday of Florence Nightingale, the founder of modern nursing. Her work had a strong influence on applied statistics, hospital epidemiology and architecture, and IPC.

Born to wealthy English parents, and benefiting from a robust education, Florence deviated from her parents' path of staying in an elite circle to become a nurse. Though nursing was mainly defined as palliative care for inevitable suffering, she considered nursing as “being in charge of others' health” for “want of a better”. (Florence, 2007) She defined rules of basic hygiene both in hospitals and private houses, both for sick and healthy people. In 1854, she was appointed by the Victorian government during the Crimean war to manage a decrepit British army hospital hosting 4,000 patients. While there, she improved hygiene measures, supply chain management, and despite facing challenges such as overcrowding, an outdated structure, uncaring physicians, and bureaucratic inertia, she helped to decrease the mortality rate from 22.7% to 2.5% among troops over a year (Chenu, 1870). (MacDonald, 2014) It was during that time there that she acquired her nickname “Lady with the Lamp,” which she carried with her on her solitary nightly rounds. After she returned home, Florence dedicated herself to a solitary confined life to report her observations and advocate for a change in modern nursing. She published these pages of facts, figures, and charts in “Notes on Matters Affecting the Health, Efficiency and Hospital Administration of the British Army,” “Notes on Hospitals” in 1859, and “Notes on Nursing” in 1860.

Florence Nightingale established good practices and recommendations based on her careful observations combined with epidemiological and statistical thinking. In *Notes on Hospitals*, she readily acknowledged and criticized the presence of multiple

confounders in hospital death reports, including age and comorbidities, and suggested improved case report forms to account for such variables. (Nightingale, 1863) At the time of dry statistical reports, she improved scientific communication by excelling in data visualization and created a now-famous mortality pie-chart reporting the different causes of death from the Crimean war. Today, modern clinical and nursing science still relies on evidence, using data collection and visualization to enhance our understanding of causality, allowing for more precise and targeted interventions and public health strategies.

“Sufferings [. . .] are very often not symptoms of the disease at all, but of something quite different”. In these *Notes on Nursing*, Florence advocated for basic hygiene principles to alleviate suffering by controlling preventable diseases, most of them still relevant in our daily routine. The core of these principles concerns ventilation, light, warmth, cleanliness, quiet, and nutrition. (Florence, 2007) She enunciated the defects that she observed in existing hospital plans. She provided exhaustive guidelines to improve the design of hospital environments, making suggestions for the heights of wards, cubic space per bed, and material used, so that ventilation, luminosity, space, and isolation were championed. (Nightingale, 1863) This approach, integrating hospital design with environmental hygiene, was entirely innovative to nursing and is still discussed today among infection prevention professionals. (Zimring et al., 2013)

Today, the importance of the work system, the construction environment and how materials and equipment facilitate IPC are highlighted by the World Health Organization (WHO) as one of the core components for effective IPC programs. (Storr et al., 2017) The crucial role of environmental hygiene in IPC has been increasingly proven in the literature. (Hobday and Dancer, 2013) A recent multicenter randomized trial performed in 11 Australian hospitals observed an effect from a cleaning regimen on cleaning thoroughness, and incidence of vancomycin-resistant enterococci infections (0.35 to 0.22 per 10'000 occupied bed-days). This regimen included optimizing types of cleaning agents, cleaning

frequency, cleaning technique, staff training, auditing with feedback, and communication, for routine cleaning. (Mitchell et al., 2019) This concept is also championed through other means such as through Clean Hospitals – an international public-private partnership working to promote research, raise industry standards, and raise awareness about the importance of hospital environment in patient care. (CleanHospital, 2020)

Nightingale also was far ahead of her time concerning hand hygiene and proclaimed that “Every nurse ought to be careful to wash her hands very frequently during the day.” Only 13 years after Semmelweis’ thesis on the importance of hand hygiene to control healthcare-associated infections, Florence wrote this recommendation in her publication “*Notes on Nursing*” as a requirement for personal cleanliness. At this time, hand hygiene to prevent such infections was poorly recognized in the scientific community as indispensable to IPC. It remained so until the 1970s and 80s with the publication of the first national hand hygiene guidelines (Simmons, 1983; Vermeil et al., 2018), and its inclusion as a key factor in CDC guidelines on healthcare-associated infections prevention. (Stewardson and Pittet, 2017) In the 90s, implementation of alcohol-based hand rub in a multimodal strategy to improve hand hygiene compliance finally created a system that was able to ultimately satisfy Nightingale’s recommendations. (Pittet et al., 2000)

Both the WHO, 5 May 2020, *SAVE LIVES: Clean Your Hands* campaign and the International Nurses Day 2020 are participating significantly in this tribute to Florence Nightingale, as they concentrate on the prevention of hospital-acquired infections through clean care. The WHO *SAVE LIVES: Clean Your Hands* campaign aims to engage all relevant actors, including healthcare professionals, patients, hospital administrators, and government representatives, in the promotion of the importance of clean hands in patient care. Health facilities can join this campaign by registering on the following website: <http://www.who.int/gpsc/5may/register/en/>. To facilitate the implementation of this campaign, advocacy toolkits are made available by the WHO: <http://www.who.int/gpsc/5may/tools/en/>.

Although much of Nightingale’s work was performed around 1860, the quality of her work was remarkable. It put patient care and well-being at the center of nursing, and a number of her recommendations are still applied to this day in nursing, IPC, and hospital epidemiology.

Conflict of interest

Didier Pittet works with WHO in the context of the WHO initiative Private Organizations for Patient Safety–Hand Hygiene.’ The aim of this WHO initiative is to harness industry strengths to align and improve the implementation of WHO recommendations for hand hygiene in health care in different parts of the world, including in the least developed countries. In this instance, companies/industries with a focus on hand hygiene and infection control related advancement have the specific aim of improving access to affordable hand hygiene products as well as through education and research. All listed authors declare no financial support, grants, financial interests, or consultancy that could lead to conflicts of interest.

The authors alone are responsible for the views expressed in this article, and they do not necessarily represent the views, decisions, or policies of the institutions with which they are affiliated. WHO takes no responsibility for the information provided or the views expressed in this paper.

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