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Connecting Contemporary Trauma Care to Florence Nightingale's Visionary Work

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REFLECTING ON OUR HISTORY

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Abstract

The impact of Florence Nightingale's visionary work continues to influence the delivery of nursing care in the contemporary emergency department (ED). Her foundational work in the Crimean War resulted in data-based recommendations for using the environment to promote healing and wellness among sick and wounded British soldiers. She advocated for attention to environmental details, including ventilation, air, warmth, drainage, cleanliness, natural light, and low noise levels. These important environmental concepts play a significant role in the nursing management of trauma patients in today's ED. This article features an application of Nightingale's environmental concepts to a trauma patient case exemplar and demonstrates the enduring impact of her work for trauma patients who receive care in the ED.

Key Words: Florence Nightingale; Emergency Department; Trauma Care; Environment

INTRODUCTION

The visionary work of Florence Nightingale has often been recognized as the foundation of the modern nursing profession. She advocated "put[ting] the patient in the best condition for nature to act upon him" (Nightingale 1859/1992, p. 75) and focused on the positive impact of environmental conditions – "air, light, warmth, cleanliness, quiet and the proper selection and administration of diet" (p. 6) – on the patient's health and wellness. Her work was influential in improving conditions for residents of nursing homes (Nightingale, 1853), decreasing the mortality rate of British soldiers in Crimea

(Dossey, 2010), guiding the British Army in incorporating female nurses into their workforce (Nightingale, 1858), advising housewives about maintaining clean homes and healthy families (Nightingale 1859/1992), advising hospital administrators on how to design a functional hospital (Nightingale, 1863), creating the first modern nursing school (Dossey, 2010), and leading significant sanitation efforts in the British colony of India (Nightingale, 1871).

Nightingale supported the purposeful integration of nurses into the hospital staff during a time when physicians did not value nurses as colleagues.

Nightingale's nursing education was quite brief, consisting of three months of training at the Institute of Deaconesses in Kaiserswerth, Germany in 1851. After three years of nursing experience in London, she traveled to Istanbul, Turkey, to become a nurse administrator for Barrack Hospital. In this role, she served as an advocate for patients and nurses, and oversaw all aspects of nursing care including emergency/trauma care for wounded soldiers. Nightingale was a strong advocate of the use of chloroform during treatment of gunshot injuries, after it was successfully used by Queen Victoria during childbirth, but had to overcome resistance from Army physicians. Faced with a high soldier mortality rate, significant supply shortages, major sanitation issues, and a very small number of nursing staff, Nightingale generated meticulous records documenting these conditions. Later, she used the statistical data derived from her records strategically to highlight the hospital's needs and obtain immediate action from the British Army (Dossey, 2010).

Nightingale engaged in important leadership roles to identify and address the emergency/trauma care needs of the soldiers. When she arrived at Barrack Hospital, she quickly emerged as an advocate for both the nursing staff and the patients. She supported the integration of nurses into the hospital staff during a time when physicians did not value nurses as colleagues. She used her volumes of data including conditions, care details, and outcomes, to support her recommendations to the Army, which led to the creation of the British Sanitation Commission. Her data collection and analysis skills enabled her to target areas for urgent improvement, including ward ventilation, unit layout, staffing ratios, staff living arrangements, treatments, and disposal of dirty

linens (Nightingale, 1858). The ultimate outcome of her improvements to emergency/trauma care provided in Barrack Hospital was the long-term adoption and use of her recommendations, most of which are still used in today's emergency departments (EDs). The purpose of this manuscript is to highlight the visionary impact of Nightingale's work in the delivery of nursing care in today's EDs, by presenting a case exemplar, followed by commentary to connect the work of Nightingale to contemporary trauma nursing care.

PATIENT CASE EXEMPLAR

History

Frank, a 60-year-old man, lost control of his automobile on an icy road and collided head-on with a large truck. He was not wearing a safety restraint; the windshield shattered and the airbag deployed. Paramedics found him unresponsive, with sleet covering his clothing. They applied a rigid cervical collar, placed Frank on a backboard, and transported him to a regional trauma center emergency department (ED); the trauma team was notified of his impending arrival.

Interprofessional Trauma Team in the Emergency Department

Paramedics provided a report to the trauma team (stretcher-side nurses, advanced practice nurses, physicians, pharmacist, respiratory therapist, laboratory technologist, and radiologic technologist) located in a staged, warmed trauma care suite. Frank's wet clothes were cut open and left beneath him to expose his body for assessment while maintaining his airway and protecting cervical spine alignment. Frank was placed on continuous vital sign (heart rate, respirations and blood pressure) monitoring, including a rectal temperature probe, and 6 liters of oxygen per minute by rebreathing facemask while a synchronized trauma assessment was initiated by the interprofessional team for identification of injuries and care prioritization. A series of X-rays were performed, and a blood sample was obtained on insertion of an IV catheter for standard trauma profile studies. Computerized tomography (CT) of the brain, chest, abdomen, and cervical, thoracic, and lumbar spine were completed.

Physical Assessment

After regaining consciousness during the assessment, Frank was confused but able to talk. His Glasgow Coma Scale score was 8/15 on arrival and 14/15 upon regaining consciousness. His pupils were round and reactive to light, chest rise was asymmetrical with diminished lung sounds on the left and clear to auscultation on the right. His oxygen saturation was 94%; respirations were 32 per minute with mildly increased work of breathing. His blood pressure was 78/40 mmHg; pulses were regular and thready at 136 beats per minute with sinus tachycardia displayed on the monitor. He was sweating, with skin cool and clammy to touch. He was in obvious pain.

The left side of Frank's face had scattered abrasions, a 4-centimeter superficial flap and a 7-centimeter complex laceration over the maxilla. A linear laceration of the right upper arm, along with significant muscle contractions and deformity of the anterior left thigh were noted; the left leg was rotated laterally and shorter in length when compared to the uninjured right leg.

Diagnostic Results and Interventions

Point of care ultrasound revealed a hemothorax of the left lung; a chest tube was placed to relieve this condition. CT revealed no injuries to the brain or spine. X-rays revealed fractures of the left hip and left femur; these were splinted and stabilized. Lab results (hemoglobin = 4.6; hematocrit = 13.8) confirmed the team's impression that the patient's tachycardia and hypotension were a result of significant bleeding. A surgeon completed an additional patient assessment and ordered a transfer to the operating room for surgical intervention. Warmed IV fluids were initiated to replace volume loss and to assist in return to normal core temperature. Packed red blood cells were administered for fluid and volume resuscitation. High-flow oxygen continued to be delivered, wounds were cleansed and dressed, and pain medication and an antiemetic were administered intravenously.

Trauma interventions used today highlight the relevance of Nightingale's concept of environmental warmth: monitoring core temperature, applying warm blankets, and pre-warming IV fluids and blood products.

COMMENTARY: CONNECTING CONTEMPORARY TRAUMA CARE TO FLORENCE NIGHTINGALE'S WORK

Nightingale's foundational recommendation of allowing the environment to engage with the patient to ensure optimal health (Nightingale, 1859/1992) continues to be a guiding principle of patient care in the modern ED setting. This commentary highlights how the environmental aspects of the care depicted in the patient case exemplar operationalizes Nightingale's principles.

Ventilation

Clearly, Nightingale was an early proponent of fresh air as an antecedent of wellness.

Nightingale (1859/1992) encouraged her nurses to consider the source of the air that patients were breathing, which may have included fumes from "gas, dinner, various kinds of mustiness; from an underground kitchen, sink, or washhouse…or even…open sewers loaded with filth"; she recommended "keep[ing] the air he breathes as pure as the external air" (p. 8). Clearly, she was an early proponent of fresh air as an antecedent of wellness.

Trauma care currently utilizes the A-B-C-D-E (airway, breathing, circulation, disability, exposure) approach to intervention prioritization. Although modern oxygenation technology (supplemental oxygen administration, ventilators, and saturation monitors) did not exist during Nightingale's career, her advocacy for fresh air remains a priority for trauma patients. Oxygen was administered during Frank's initial assessment by the trauma team, and his response will continue to be monitored.

Pure Air

Nightingale believed that air breathed by the patient must be pure and free from effluvia (her term for offensive smells), and used ventilation to remove the source (Nightingale, 1859/1992). For her, these sources likely included excreta, blood, phlegm, and other body fluids, as well as smoke from chimneys. When she arrived at Barrack Hospital, she observed a live sewer flowing beneath the floorboards, a condition that she quickly had repaired as a health promotion action (Dossey, 2010).

The environmental air in today's ED is controlled by a ventilation system, often manifested as designated isolation rooms with one-way airflow for patients with suspected/confirmed airborne conditions. Trauma patients such as Frank have their oxygenation needs addressed by administering supplemental oxygen and monitoring their oxygenation status. If Frank's injuries were severe enough to impact his ability to breathe effectively, the trauma team could elect to place him on a ventilator.

Warming

Nightingale (1859/1992) devoted special attention to keeping the patient warm. "A careful nurse will keep a constant watch over her sick, especially the weak, protracted, and collapsed cases, to guard against the effects of the loss of vital heat…"; she supported the use of "hot bottles, hot bricks or warm flannels, with some warm drink…" as heat sources (p. 11). She utilized all available methods to provide warmth to her patients and paid close attention to the impact that environmental temperature had on a patient's health status.

Several trauma interventions used today highlight the continued relevance of Nightingale's concept of environmental warmth. Although Frank's clothing was cut to provide access for trauma care, his core temperature continued to be assessed by rectal temperature probe. Warm blankets were strategically placed, and intravenous fluids and blood products were warmed prior to administration to prevent Frank's core temperature from dropping.

Efficient Drainage

The foundation for modern sanitation methods was in development during Nightingale's career. Her work predated the development of concepts of sterility and sanitization; however, the application of her environmental concepts (ventilation, air, warmth, drainage, cleanliness, and light) for the promotion of health are in alignment with germ theory (McDonald, 2021). She consulted on improved sanitation efforts in the British colony of India (Dossey, 2010). She noted that sources of impure drainage were associated with the spread of infectious disease (Nightingale, 1859/1992).

Modern hospitals are adept at identifying and correcting problematic sewage and drainage issues, and these issues rarely, if ever, are associated with changes in the condition of a trauma patient. However, modern trauma patients such as Frank often experience individual/personal drainage, such as wound or chest tube drainage. In order to provide sanitary care to Frank, the collection and disposal of this excreta follows the same sanitation guidelines that Nightingale recommended for sewage. For example, his wound care utilized sterile gauze and other materials. His chest tube was inserted using sterile technique, allowing the chest tube drainage to be collected in a manner that made it easy to quantify, and kept Frank and his environment free from a pool of drainage, as well as any resulting effluvia.

Cleanliness

Nightingale (1859/1992) was a strong advocate of cleanliness, and identified sources of filth to include: "old papered walls…dirty carpets…uncleansed furniture" (p. 16). She observed the effects of an unclean environment on the soldiers in Barrack Hospital and noted how the lack of sanitary conditions hindered recovery, hastened death, and increased mortality rates (Dossey, 2010). Her belief in maintaining a clean environment to keep patients free from illness is supported by her concepts of ventilation, pure water, and efficient drainage.

Maintenance of cleanliness during Frank's trauma care was challenging. During the trauma assessment, Frank's bloodstained clothes were not completely removed, but were cut open to provide easy access to his body during the trauma assessment. His hair and skin were covered in dirt, blood, and glass. The trauma team needed to discard equipment packaging on the floor. When Frank's IV was started, he bled onto the floor and his stretcher. However, after Frank went to the OR for surgical intervention, the trauma bay was cleaned and sterilized for the next trauma patient.

Light

The windows of Barrack Hospital were covered with boards when Nightingale arrived; one of her first actions was to have the boards removed to provide a natural source of

light. She connected environmental sunlight to a decreased time needed for convalescence, sharing her belief that "a dark house is always an unhealthy house" (1859/1992, p. 16).

Most trauma bays do not include windows, and therefore do not offer a source of natural sunlight. Frank's accident occurred around midday; therefore, he did have small natural light sources from the ambulance windows, as well as in the trauma suite from a small window located above the head of his bed. Frank spent about 90 minutes in the trauma suite before moving to CT scan, the operating room and ultimately to the critical care unit. His private room featured a large window that overlooked the downtown area.

Light is an important factor in Frank's overall care. A proper initial assessment by the paramedics and by the trauma team required a reliable source of light to allow proper observation of Frank's external injuries and to provide important data that would direct his plan of care. The technology used to assess Frank's oxygen saturation and his pupillary reactions requires light sources. Although that technology was not available to Nightingale, it is possible that she could have expanded her concept of light to include non-environmental light sources that aided in the patient's care.

Quiet

Soldiers in Barrack Hospital were exposed to noise from artillery and other weapons as well as cries of pain and suffering from their comrades. Nightingale (1859/1992) had strong beliefs regarding noise exposure and wrote that "unnecessary noise that creates an expectation in the mind is that which hurts a patient"; … "anything that wakes a patient suddenly out of his sleep will invariably put him into a greater state of excitement" (p. 25). She did not approve of conversations outside the patient's room, whispering inside the patient's room, noise generated by women's dresses, or other sources of "unnecessary noise" (Nightingale, 1859/1992, p. 27).

It is nearly impossible for a trauma patient such as Frank to avoid noise. The ambulance siren cannot be muted, as it serves to alert other motorists of the need to move through

traffic safely. Upon arrival to the ED, there will be significant discussion among the trauma team to ensure safe, quality care. The equipment used to stabilize and treat Frank, such as IV pumps, oxygen administration apparatus, and heart and oxygen saturation monitors, may be loud, but the alarms are needed to keep the trauma team informed if Frank's condition changes. Fortunately, the critical care unit should provide a quieter environment for Frank, through designated visiting hours, limited visitors, and clustered nursing care. This intentional reduction of environmental noise promotes Frank's recovery.

CONCLUSION

Florence Nightingale's visionary work serves to guide the practice of trauma care in today's ED. Contemporary nurses continue to utilize Nightingale's principles in the provision of safe, quality trauma care. Her environmental approach to nursing care, encompassing ventilation, air, warmth, efficient drainage, cleanliness, light, and quiet, remains relevant and important. The outcome of Nightingale's foundational principles being utilized in trauma care today is simple, yet noteworthy: effective treatment leading to improved quality of life for trauma patients.

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