Expanding Environmental Care Competencies for Future and Current Healthcare Providers

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ABSTRACT

The multiple impacts of the environment on the health of populations can oftentimes be clouded by the daily care practices of healthcare providers. This case study describes an innovative graduate level elective course that uses a problem-based approach to apply evidence-based principles of environmental health to the care of populations. Initial implementation of the course, over two cohorts in 2023, had primarily second-degree undergraduate nursing students. Lessons learned included the necessity to provide peer-to-peer support for several of the graduate level assignments. Positive student outcomes included an expanded understanding of the three main content areas of the course: (1) how soil, air, and water must be considered in individual and population-centered care; (2) the impact of the design of the built and healthcare built environment; and (3) considerations of planetary health for sustainability and mitigation. Faculty outcomes included coaching of undergraduate students in this graduate course and the development of peer-to-peer mentoring activities.

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The environment is one of the four concepts in the nursing metaparadigm of care originally presented by Jacqueline Fawcett (1984), an internationally recognized nurse theorist. Fawcett (2023) has adapted the original four concepts (humans, environment, health, and nursing), based on continuous discussions into her current iteration: *human beings*, *global environment*, *planetary health*, and *nursology* (Fawcett, 2023). Human beings demonstrate a more globally and community interpreted human presence. Global environment also takes into consideration the connected environment across the world and its interrelationships. Planetary health takes into the consideration of not only human beings health but the health of all living things and those situations that may have an impact. Nursology, according to Fawcett et al. (2015), is defined as the discipline of nursing encompassing both the methods of research and practice. As Fawcett states, concepts evolve as the does the practice of nursing.

While the environment was included as an original concept in the nursing metaparadigm, it slid into opaqueness in the practice of evidence-based care and research approaches until the illumination of climate's impact on the

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environment. The authors of this paper have been involved in the practice to take care of the environment for a cumulative 70 years. Expertise developed around water, waste, built and healthcare built environments, and climate mitigation and sustainability has informed our practice. Appreciating the need for nurses to come back to an understanding of the environment and its impact on a person's well-being, we developed a graduate elective course. This case report describes the development and implementation of the course with two cohorts, and an evaluation of student and faculty outcomes.

ANALYSIS OF THE CASE

The Academic Course

The concept and development of the course, The Environment and Health of Populations, was initiated and submitted to a university-wide challenge grant for which we were selected as recipients. As we further developed the curriculum, we invited the Program Director of our school's doctoral training program in Occupational and Environmental Health Nursing (AWS), which is part of the National Institute for Occupational Health (NIOSH) funded NY/NY Education and Research Center (T42-OH-008422). The training grant is interprofessional, and intraprofessional in its implementation within our college, including Doctor of Nursing Practice (DNP) and PhD students. Our combined areas of expertise evolved into a three-module course, each building on the previous.

The course syllabus presents the content in three modules. Each module builds a foundation on which subsequent modules flow. The concepts of each module are Fundamental Earth Elements, the Built and Healthcare Built Environment, and Planetary Health. The course is delivered as an online, hybrid project-based course where didactic and class activities are interspersed with project-based assignments and activities.

This is a graduate level elective course. It is not a required course as there is no curricular room for a new required course. The recently updated American Association of Colleges of Nursing *Essentials* (AACN, 2021) have domains that include population health and the concept of social determinants of health, which are addressed in the context of environmental health in this course. Each assignment is graded according to a faculty developed grading rubric, with a letter grade at the end of the course.

The first module focuses on developing a deeper understanding of the basic environment with its focus on earth's fundament elements (soil, air, and water). The module details how these elements interact with one another and result in overall health for humans, animals, and nature. The module concluded with a guest lecture by a healthcare design architect who shares how healthcare designers consider soil, air, and water's impact on the interior and exterior of buildings for the health of patients, workers, and visitors. This guest lecture served as a segue for the second module.

The second module delves into the built environment and, more specifically, the healthcare built environment. Design features and built environments affect the health and well-being of all communities (Nathan et al., 2018). The history of occupational and environmental health nursing is also presented. Students are asked to identify and discuss an occupation and how the environment impacts their work and health. Deeper discussion on the interior and exterior design of healthcare facilities and impact on the environment brings the previous guest lecture into the nurses' lens. This module concludes with students, in teams, designing a hypothetical restorative space on a clinical unit. The first implementation of the course allowed us to bring together a previously created architect and nurse faculty team, where one of the course faculty (RTK) is a member. This interdisciplinary team used the architect design strategy of a

charrette to teach the students and other course faculty this concept. The second implementation of the charrette design had the nursing guest and course faculty leading the activity.

The third module brings together concepts from the previous modules to discuss how the environment and climate changes impact planetary health. Climate science is discussed and examples of how this evolving science examines and makes evidence-based recommendations for sustainability in human, animal, and planet health. Students are asked to critically discuss how the environment impacts a long list of physiologic, physiologic, developmental, social, and cultural domains for individuals and populations. Climate adaptation and mitigation strategies are discussed regarding their positive and negative impacts. Guest speakers share real-time policies and practices being implemented by their respective institutions and stakeholders. Examples include national policies on how healthcare settings should be built, sustainability measures being implemented at an academic setting, and a local campaign to highlight the impact of fossil fuels on the planet and climate.

Case Participants

The clients in this case report are the students enrolled in The Environment and Health of Populations graduate elective course. Due to most master's specialty programs having no or only one elective available, there was under enrollment in the course. To support course enrollment numbers, it was decided to permit, with permission of the faculty, the enrollment of undergraduate nursing students. Students who were funded by the occupational and environmental training grant have the option of taking this elective course. The course was developed and approved as a graduate course; therefore, all readings and assignments were at this level. Project teams were identified by the students. The first cohort had two DNP students and five second-degree undergraduate nursing students. One project team had two DNP and one second-degree student, and the second team was composed of three second-degree undergraduate nursing students.

Assignments included individual reflection papers after each module. Other assignments were group assignments based on the population of interest and environmental condition identified by the student team members. This final paper, similar to an unfolding case presentation which brings in previous knowledge and dissemination, was a synthesis of all scholarly paper sections. These sections include a narrative document to support the rationale for selecting the population and environmental condition, and a literature review was shared as a table of evidence. A table of evidence is a format to display all the relevant research with categories including all levels of the research process: study citation, study aim, design, interventions, findings, level of evidence and strengths and weaknesses. From the literature synthesis, the student teams are asked to identify a policy or mitigation strategy and discuss its feasibility. From the final integrated paper, students create an infographic to display the main points of population at risk, environmental situation, and evidence-based policy or mitigation strategies to support the population. The infographic was used to present the team's findings in a class presentation. Table 1 displays the infographic populations of interest and environmental situation.

Table 1

Infographics: Academic Semester, Population of Interest, and Environmental Situations

Academic Semester	Population of Interest	Environmental Situation
Spring, 2023	Community	Legionella contaminated water sources
	Community	Exposure to mold
Fall, 2023	College students	Built environment impact on college students mental health
	People of reproductive age	Exposure to air pollution

Effective Strategies

The reflective papers brought to the forefront what the students learned from each module where they were required to share examples of the concepts. As requested, they also shared ideas regarding suggestions for outside resources including bringing in more guest speakers and more short videos. When asked if the videos would be as pre-class work or during class, the students suggested they be presented in class.

The group assignments created the greatest understanding of undergraduate and graduate assessment competencies, especially regarding the development of the table of evidence. Resources were posted on the learning management system on the why and how to create a table of evidence. The first cohort, as mentioned above, had two student teams, one which included two DNP students and one second-degree undergraduate student. The second student team was comprised of all second-degree undergraduate students and their table of evidence submission was not complete. The faculty requested permission from the team with the two DNP students to share their completed table of evidence with the other team. Using peer-to-peer teaching is most helpful to disseminate understanding across a student population, especially with difficult and very novel concepts (Awan, 2021). The recipient student team, with the assistance of the peer shared table of evidence, were successful in completing the assignment.

The infographics created by both cohorts were attentive to the content to be shared using limited text, appropriate pictures/graphics to demonstrate attention to health literacy concepts relevant to the identified population of interest.

Students in both cohorts were very articulate in sharing where they may be in the next five years related to supporting environmental health within their communities; personal and professional.

Recommendations

Input from students support the importance of content on soil, air, and water as there was often an assumption that they just exist. The majority of students had not been exposed to the concepts of the built and healthcare built environment. The design of the built environment (Karmeniemi et al., 2018) and healthcare built environment (O'Hara et al., 2017) are paramount to the overall health of a community and populations. The synthesis module on planetary health brings the students and learner full circle into understanding the who, what, and how of nurses addressing all aspects of the environment as an important aspect of evidence-based practice (Evans-Agnew, 2022).

The preparation of nursing students to understand the science in these areas and translate it into action in their personal and professional lives is critical. Although there is a global understanding and current discussion around the vital importance of the environment and the health of communities, there is a dearth of exposure to this content in their academic nursing programs. This course was created to close this gap at a large urban institution and begin paving the way for students to graduate with a foundation in addressing environmental factors and health. We have committed to disseminating this unique course programming and have shared our environmental health pedagogy with several national and international academic institutions and their faculty.

The climate's impact on health of humans, animals, and the planet is very dynamic. Nurses are at the front lines in the identification of exposures to the populations for which they provide care. Educating the current and next generations of nurses as to what fundamental elements may create exposure, how the built and healthcare environment may support positive or negative situations, and how the planet of living creatures responds is a 21st century expansion of the nursing process. We continue to bring the most current practice and mitigation strategies and policies into the classroom to maintain an up-to-date, evidence-based education for nursing students at all levels of their education.

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