Advancing Theory and Practice Through Collaborative Research in Environmental Gerontology

Linking specifics of health care environments and health outcomes has long been documented as an area of interest for nurses. Florence Nightingale is credited for drastically improving mortality rates of British and allied soldiers in a hospital established in the Ottoman Empire during the Crimean War (1854) by focusing on this association. Her *Notes on Nursing* (Nightingale, 1859) sums up her observations of improved sanitary conditions, air quality, quantity and quality of noise, among other variables, as well as mechanisms by which these impact patient health. She was instrumental in establishing performance measures in health care and making comparisons across environments possible.

Gerontological nurses traditionally conduct research that examines human responses to health and illness within a holistic framework. Contextual factors are included or controlled in the research design and analysis phases. When considering physiological, social, or economic variables, nurses often collaborate with scientists with depth of expertise in these specific fields. Nurses do not, however, often collaborate with architects and experts in environmental gerontology. Yet, many factors within the immediate environment, including home, public, and community environments, can influence human responses, particularly when individuals are ill, frail, or cognitively impaired (Geboy, 2009). In the current editorial, approaches to studying the environment in gerontological research studies are described, and specific variables that are salient for this population are outlined.

ENVIRONMENTAL THEORY AND HOLISTIC RESEARCH

A theoretical framework that has informed much of the research in environmental gerontology in the past four decades has been proposed by Lawton and Nahemow (1973). Their ecological model of competence-press posits that health, functional status, cognition, time use (i.e., variation in stimulation, as well as use of time), and social behavior of an individual need to be understood within the context of the environment so that appropriate treatments or environments suitable to that specific population are designed. According to the model, the range in environmental “press” an individual is able to adapt to relates to the competence level of that individual. Thus, environments have a more pronounced effect on the quality of life for individuals with lower competence levels.

Most environmental research has been holistic and qualitative. Holistic models of the environment take into account a wider variety of variables as well as their reciprocal interactions. Rather than envisioning discrete variables having a direct and causal impact on outcome variables, a model with complex inter-relations is assumed. A number of instruments are used to qualitatively and holistically assess environments for cognitively impaired older adult populations. Although some may be administered by non-specialists, such as The Therapeutic Environment Screening Survey for Nursing Homes (Sloane et al., 2002), others require an administrator’s input as well as expertise in environmental assessment to complete. The latter category includes the Professional Environmental Assessment Protocol (PEAP), a standardized evaluative instrument that assesses the environment in eight interrelated domains: (a) maximization of awareness and orientation, (b) maximization of safety and security, (c) provision of privacy, (d) regulation and quality of stimulation, (e) support for functional abilities, (f) provision of opportunities for personal control, (g) encouragement for continuity of the self, and (h) facilitation of social contact (Lawton et al., 2000). The capacity to study environmental features in relation to other factors, such as an older adult’s capabilities, unit
philosophy of care, activity program, or social context, is central to the PEAP instrument.

Although these approaches to examining environmental interactions have advanced the understanding of the interplay of environmental attributes as experienced, research has been largely descriptive and, according to experts in the field, has not advanced as much as is needed (Cutler, Kane, Degenholtz, Miller, & Grant, 2006; Wahl, Iwarsson, & Oswald, 2012). Measures related to environmental concepts have not been adequately developed or consistently measured across multiple disciplines. The inability of the PEAP and other environmental instruments to quantitatively measure constructs has limited usefulness in quantitative studies and clinical trials.

Quantitative Measures of Discrete Variables

Alternatively, a more granular approach is less likely to mask variations that more global measures fail to capture. A single static measure may be examined within multivariate models to examine the interplay of environmental variables with older adults’ responses to health and illness. However, many health and health care delivery questions would benefit from dynamic assessment over time. Multiple measures over time would allow consideration of whether within-day versus between-day variability in the environment influence an outcome such as falls, medication errors, or time to treat. Survival analysis would afford inclusion of time-varying predictors and the evaluation of whether the influence of a predictor remains constant or changes over time (McCarthy, Ding, Pines, & Zeger, 2011).

Several examples of discrete measures appropriate for inclusion in research studies are provided. It should be kept in mind that discrete measures of the environment may contribute to more than one attribute of place experience. For instance, room size and shape, as well as the number of occupants within a given space, may contribute to an individual’s orientation to that environment, level of stimulation, and the ability to regulate levels of stimulation, opportunities for personal control, and facilitation of social contact. An intervention delivered in a large room may yield different results than when it is delivered in a smaller space that reduces overstimulation and aids in orientation by providing unique vantage points.

Crowding

Crowding is the psychological feeling experienced by an individual when the perceived density (i.e., number of individuals) in an environment is beyond what is contextually tolerated by that individual. In a long-term care facility, crowding may be measured by the number of individuals surrounding a given resident within an environment of specific shape (e.g., square, L-shaped) and size (i.e., square feet) at any given time. Crowding may interfere with an individual’s ability to achieve personal control by hindering his or her ability to perceive environmental queues. Because personal control is a salient factor in achieving reduced agitation, it is potentially a mitigating factor in reducing the stress caused by crowding. Emergency department and clinic crowding may impact quality of care and time to receive care.

Illuminance

Illuminance is the measure of the perceived power of light per unit area and is measured in lux or lumens per square meter. Light has a strong influence on circadian rhythm and should be considered in studies that involve or are impacted by diurnal variations. The value of light can be easily obtained by an illuminance meter. Researchers have examined the influence of morning bright light treatment using a 6,000 to 8,000 lux light source to treat agitation, lack of daytime alertness, and sleep problems of individuals with dementia. The amount of light within a given environment is dependent on both natural and artificial lighting, as well as the characteristics of horizontal and vertical surfaces. Window size, shape, location, and position with regard to cardinal directions, as well as the characteristics of indoor lighting, may play a role in illuminance. Lighting may influence safe mobility, wayfinding, and the ability to read health care information.

Acoustic Comfort

Individuals value and tolerate different levels and types of sounds. Hence, comfort with the acoustic environment can vary, but there is general agreement that the acoustic environment should support the functions of individuals within a space and not be deemed as noxious by the majority of users. An important component of acoustic comfort is sound intensity. Sound intensity is commonly measured in decibels. A value can be easily obtained via a sound level meter. Alarms on technological devices in the hospital may disrupt patient sleep and increase agitation. In long-term care settings, the sound source (e.g., television, public address [PA] system, conversation), as well as its characteristics (e.g., cohort-appropriate musical genre, PA announcements not relevant to the resident), may play a role in resident comfort and health.
CONCLUSION

Daily activities and human responses to health and illness occur within specific environmental settings. Understanding the factors within environments that facilitate or hamper health, behavior, affect, and care delivery can provide new insights of theoretical and practical importance. The field of environmental gerontology has made great strides in conceptualizing the attributes of place experience and the importance of considering the interplay of multiple environmental variables. Methods used to measure environmental variables will affect the inferences one can make. Although progress on developing quantitative measures that capture this holistic assessment has been limited, quantitative measure of discrete variables may be used within multivariate modeling to examine the interplay of environmental variables. Researchers are encouraged to partner with experts in environmental gerontology. Incorporating environmental variables as moderators, mediators, control variables, or active treatment components can strengthen gerontological research and the understanding of mechanisms for advancing gerontological health care.

REFERENCES


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