A Review of Design and Policy Interventions to Promote Nurses’ Restorative Breaks in Health Care Workplaces

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Abstract: The nursing profession in the United States is on the precipice of a crisis. Nurses are essential to the health care industry, and maintaining quality nursing care is a primary concern of today’s health care managers. Health care facilities report high rates of staff burnout and turnover, and interest in the nursing profession among younger students is declining. Health care leaders must improve nurses’ job satisfaction, performance, and retention. However, they often overlook the need for nurses’ respite and underestimate the value of well-designed staff break areas. An exhaustive and systematic literature search was conducted in the summer of 2014, and all studies found on the topic were reviewed for their relevance and quality of evidence. The existing literature about the main causes of nurses’ fatigue, barriers that prevent nurses from taking restorative breaks, and consequences of nurses’ fatigue for staff, patient, and facility outcomes demonstrates the pressing need for interventions that improve nurses’ working conditions. Additional literature on the restorative effects of breaks and the value of well-designed break areas indicates that efforts to improve breakroom design can play an important role in improving nurses’ job satisfaction and performance.

Keywords: nurse, fatigue, rest break, policy, break spaces, built environment, health, quality of care

Nurses are a valuable health care resource. However, nursing is an extremely stressful job, and health care facilities have difficulty maintaining the quality of their staff (Clegg, 2001; McVicar, 2003). This article discusses the causes of nurses’ fatigue and the negative impact of fatigue on patient outcomes and the health of staff members. More optimistically, the article turns to the positive impact of restorative breaks on staff health and performance, and the researchers present a literature review on the role of physical environments in facilitating refreshing breaks for nurses working in health care facilities. Finally, existing evidence is summarized on how access to nature, daylight, and fresh air can improve human health, performance, and satisfaction in this context.

This systematic literature review was initiated by exploring challenges that nurses currently face in the United States. The literature search focused on empirical studies that linked design and policy interventions related to staff restorative breaks with health care outcomes. The search was conducted in the summer of 2014 and identified relevant studies published in English. Twenty-seven keywords about staff, patient, and facility outcomes (i.e., stress, fatigue, medical error, quality of care, turnover, retention); policy and design interventions (i.e., rest breaks, napping, respite, daylight, nature, outdoors, fresh air); and health care settings (i.e., inpatient, outpatient, hospital, clinic) were used. Combinations of these keywords were used to search several databases, including EBSCO, MEDLINE (PubMed), and Google Scholar. The EBSCO database included other databases such as Academic Search Premier, Alt Healthwatch, PsycArticles, PsycINFO, and CINAHL. Due to minimal evidence on the topic, the initial list included all studies relevant to nurses’ restorative breaks in health care workplaces; reference lists of these articles were also examined to find additional relevant studies. Then, studies were reviewed in terms of research design and evidence quality and whether the journal was peer-reviewed.

Nursing Staff Fatigue and Performance

Aaronson and colleagues (1999) defined fatigue as “a decreased capacity for physical and/or mental activity due to an imbalance in the availability, utilization, and/or restoration of resources needed to perform the activity” (p. 46). Fatigue has been recognized as a significant problem among nursing staff,
and the most important factors contributing to this fatigue have been identified as nurses' extended work hours, consecutive shifts, insufficient sleep, long travel or walking distances, and lack of rest breaks (Rogers & Hughes, 2008).

Due to staff shortages beginning in the late 1970s, nurses' work hours were gradually extended, and today it is more common for nurses to work 12-hour rotating shifts (Josten, Ng-A-Tham, & Thierry, 2003). Based on a recent survey by the American Nurses Association (2009), 59% of nurses in the United States work 12-hour shifts. A study by Gold and colleagues (1992) reported that the incidence of falling asleep happened at least once a week for 32% of nurses with permanent night shifts, 35% of nurses with regularly rotating day-to-night shifts, and 21% of nurses who worked day shifts interspersed with occasional nights. Hendrich, Chow, Skierczynski, and Lu (2008) found that nurses walk on average 2.4 to 3.4 miles during each daytime shift. This walking activity is in addition to all of the routine exertions of nursing activities, both physical and mental, that staff engaged in during the course of their work.

A final concern that has been associated with nurses' fatigue is a lack of meal and no-break meals during the course of their shifts (Witkoski & Dickson, 2010). Relatively few studies have focused on this issue for hospital nursing staff, but research in other work settings has indicated the importance of rest breaks for managing fatigue and improving short-term performance (Dababneh, Swanson, & Shell, 2001; Faucett, Meyers, Miles, Janowitz, & Fathallah, 2007; Galinsky, Swanson, Sauter, Hurrell, & Schleifer, 2000; Tucker, Folkard, & Macdonald, 2003). Existing studies on healthcare environments do show that nurses often lack opportunities to take breaks. Rogers, Hwang, and Scott (2004) found that nurses had no opportunities to sit down for a break during 10% of their work shifts. Furthermore, in 43% of their work shifts, nurses were not free from patient-care responsibilities during breaks, leading to frequent interruptions of their breaks. On average, the total amount of time that nurses spent on break was only 26 minutes during their entire 12-hour shift. In another study, Trinkoff, Geiger-Brown, Brady, Lipscomb, and Muntaner (2006) reported similar results, finding that nurses had no opportunities at all for breaks during 11% of their working shifts. A large study by the American Nurses Association (2009) indicated that 35% of nurses reported taking a meal-length break “rarely or never.”

Reasons nurses are unable to take refreshing breaks were not always clearly described in the literature discussed above. Furthermore, the studies demonstrated that nurses frequently had to sacrifice their breaks to fulfill patient-care responsibilities assigned to them. Barriers to breaks are related to institutional policies, federal and state regulations, or lack of restorative staff break areas in health care facilities. Institutions can prevent nurses from taking refreshing breaks by assigning heavy workloads, hiring insufficient staff, and poorly scheduling staff (Faugier, Lancaster, Pickles, & Dobson, 2001). A contributing factor is the absence of federal regulations mandating break periods for hospital nursing staff. In the United States, federal law leaves the option of providing short breaks at the discretion of individual employers and stipulates that longer meal breaks need not be compensated as paid work time (U.S. Department of Labor, 1961a, 1961b; Witkoski & Dickson, 2010). State-level regulations can also grant rights to employees, but currently, only 20 states have regulations that provide nursing staff with a legal right to rest breaks. Many large states with extensive health care industries (e.g., Florida, Ohio, and Texas) simply reiterate the sparse federal regulations (U.S. Census Bureau, Population Division, 2013). This lack of oversight extends to the creation of restorative spaces for staff breaks, which are also seldom required by law (Witkoski & Dickson, 2010).

Fatigue negatively affects nurses’ quality of life, from long shifts, insufficient sleep, lack of rest breaks, or a combination of these factors. Fatigue can lead to physical and psychological health issues and an overall reduction in well-being (Wagner-Raphael, Jason, & Ferrari, 1999). Staff fatigue can also affect the quality of patient care that nurses provide and, therefore, institutional outcomes and associated costs.

Fatigue and Physical Health

Fatigue can directly affect the physical health of nursing staff by increasing their risk of injuries, particularly musculoskeletal and “needlestick” injuries. Trinkoff, Le, Geiger-Brown, and Lipscomb (2007) examined the association between long work hours and the risk of needlestick injuries among more than 2,000 nurses. The researchers found that working 12-hour or longer shifts and working shifts other than day shifts were associated with a significant increase in the risk of a needlestick injury. In a separate study of more than 11,000 nurses, Clarke (2007) also found a correlation between shift length and the likelihood of a needlestick injury. Health care facilities face significant costs related to these on-the-job injuries. For example, in one recent study, researchers found that the cost of treating needlestick injuries in the state of Washington averaged approximately US$200,000 per year (Shah, Bonauto, Silverstein, & Foley, 2005).

In regard to musculoskeletal risks, multiple studies have shown that the physical demands of the nursing profession, combined with fatigue and sleep deprivation, can lead to increased rates of work-related musculoskeletal disorders (WMSD) of the neck, shoulders, and back (Haack & Mullington, 2005; Lipscomb, Trinkoff, Geiger-Brown, & Brady, 2002; Trinkoff, Le, Geiger-Brown, Lipscomb, & Lang, 2006).

Fatigue and Mental Health

Existing studies on the mental health aspects of fatigue have focused primarily on sleep deprivation. The inability to maintain a healthy sleep schedule can directly affect nurses’ psychological health by increasing their risk for depression and cognitive, psychomotor, and behavioral disorders (Banks & Dinges, 2007). A recent study by Bara and Arber (2009) found an association between working night or rotating shifts for more than 4 years and higher levels of anxiety and depression.
Likewise, Ruggiero (2003) found that nurses who work night shifts reported a greater incidence of depression. Furthermore, fatigue caused by chronic insufficient sleep has been found to increase negative mood and decrease psychosocial functioning (Franzen, Siegle, & Buyssse, 2008; Haack & Mullington, 2005).

These negative mental health aspects of fatigue have implications for nurses’ ability to provide quality patient care. For example, fatigue caused by sleep deficiency has been found to significantly reduce performance in psychomotor vigilance tasks. Nurses whose mood and psychological health has been eroded by fatigue exhibit less alertness and greater frequency and duration of attention lapses (Dinges et al., 1997; Franzen et al., 2008). Studies have consistently shown that mental fatigue can result in slower response time, errors of omission and commission, compromised problem-solving skills, and less motivation to and vigor in completing necessary tasks (De Vries-Griever & Meijman, 1987; Gravenstein, Cooper, & Orkin, 1990; Jewett, Dijk, Kronauer, & Dinges, 1999; Kahol et al., 2008; Lim & Dinges, 2008).

Fatigue and Patient Outcomes

Physical and mental fatigue can impair staff performance and increase the odds of health care error, sometimes with dire consequences for patients (Rogers & Hughes, 2008; Witkoski & Dickson, 2010). Dorrnan and colleagues (2006) conducted an extensive study on the association between health care errors and fatigue due to lack of sleep. They found that sleep duration was a significant predictor of error occurrence, with the incidence of errors rising as nurses’ hours of regular sleep diminished. They also found that lack of sleep impaired nurses’ ability to identify errors committed by others.

Rogers, Hwang, Scott, Aiken, and Dinges (2004) examined the association between the length of nurses’ work hours and incidence of errors. They found that nurses working 12.5-hour shifts or longer were 3 times more likely to commit a health care error compared with nurses working shorter shifts. Working more than 40 hours per week was also found to significantly increase the likelihood of patient-care errors. These researchers found that 58% of the errors reported during their study period were related to medication administration.

Additional studies have replicated this finding, indicating that nurses who work extended shifts are significantly more likely to commit errors or near-errors in patient care and contribute to a higher incidence of adverse events (Barger et al., 2006; Scott, Rogers, Hwang, & Zhang, 2006).

In addition to health care errors, fatigue can erode more subtle aspects of nurses’ performance, such as perceived attentiveness to patients. Barker and Nussbaum (2011) examined the relationship between mental and physical fatigue and nurses’ overall job performance. They found that mental fatigue was more prevalent than physical fatigue, that longer shifts and more work hours per week were positively associated with fatigue levels, and that all of their measured fatigue dimensions were significantly associated with reductions in perceived performance. Josten et al. (2003) found that even small differences in fatigue could affect nurses’ performance. These researchers compared nurses who worked 8-hour shifts with those who worked 9-hour shifts. They found that nurses who worked longer hours exhibited more fatigue, had more health complaints, were less satisfied with their jobs, and received poorer performance ratings (Josten et al., 2003).

The Value of Restorative Breaks

Some health care facilities have improved work environments for their staff. For example, Massachusetts General Hospital recently experimented with an hour-long, off-unit meal break program as part of their Transforming Care at the Bedside initiative. Day shift nurses working in a 20-bed medical-surgical unit were encouraged to leave the work environment and take an extended break during the middle of their shifts. The program required a major cultural adjustment in the unit, as staff were not accustomed to leaving their work unit during their shifts. However, after adjusting to this new structure, nurses reported feeling refreshed and less fatigued. They engaged with their colleagues, were more alert, and demonstrated better time-management skills (Stefancyk, 2009).

Another example of a health-promoting break program has been developed by Taylor (2005). In Taylor’s model, nurses take collective “booster breaks” for 10 to 15 minutes and can include restorative activities such as healthy snacks and mindfulness exercises (e.g., yoga, tai chi, meditation). As with the Massachusetts program, this initiative requires a cultural change in the work environment as nurses learn to temporarily step away from their responsibilities. However, Taylor has argued that this change fosters nurses’ physical and psychological well-being by providing a regular reprieve from the ongoing stress of the work environment. The Washington State Nurses Association has likewise endorsed “uninterrupted rest breaks” that give health care workers a chance to relax. This organization has supported legislation to ensure that all nurses have break opportunities, for the benefit of both their own well-being and that of their patients (Washington State Nurses Association, 2008).

When considering the value of restorative break programs, it is necessary to define what is meant by “rest.” In the programs described above, rest is understood not merely as a cessation of certain physical activities, but rather an opportunity to relax by taking on a different mind-set. This understanding is grounded in research literature on the components of a restorative break. Nurit and Michal (2003) provided an extensive meta-survey on the nature of meaningful, restorative rest and formulated a definition of rest as “physical and mental activity resulting in a relaxed state” (p. 227). Their results indicated that the restorative value of rest emerged from engaging in “activity that was personal, quiet, and effortless, experienced alone or with friends” (p. 227). Thus, programs that support restorative breaks should focus not merely on a reprieve from active duties, but also on positive opportunities for staff to engage in healthy non-work activities.
Strategic Napping Programs

The value of sleeping during breaks at health care workplaces is controversial. A few hospital organizations, such as the Veterans Health Administration, have implemented a “strategic napping” program as part of their initiative to address nurses’ sleep deprivation (Howard & Schuldheis, 2008), with the intention of improving the alertness and performance of frontline health care workers. This initiative includes the creation of dedicated areas in the unit where nurses can take quick restorative naps. A handful of studies in health care settings indicate that such naps can reduce fatigue (Driskell & Mullen, 2005; Milner & Cote, 2009). Many health care leaders, however, remain skeptical about the effectiveness of these programs and the institutional value of encouraging employees to sleep during work shifts.

Arora and colleagues (2006) conducted a year-long study of fatigue levels among 38 interns in an academic teaching hospital. Some of the interns were assigned a schedule that included naps; others maintained a standard schedule without naps. The two groups swapped schedules every 2 weeks. The researchers found that interns on the napping schedule slept more overall minutes per day and reported less overall fatigue than the traditional schedule interns. A similar study by Smith-Coggins and colleagues (2006) demonstrated that a 40-minute nap during a 12-hour night shift reduced fatigue. Comparing a napping group with a control group, these researchers found that the napping group had fewer performance lapses and reported more vigor and wakefulness. However, in this study, the researchers also found that it took time for the staff to reach maximum performance after waking from a nap; they demonstrated poorer memory immediately on waking. However, the staff also showed fewer behavioral signs of inattentiveness and sleepiness during the remainder of the shift compared with the control group.

Rest Breaks and the Quality of Patient Care

Studies in other fields suggest that restorative breaks enhance performance and reduce the risk of errors and accidents, as shown in a review of diverse industries (Tucker, 2003). However, very few studies have examined the effect of nurses’ rest breaks on the quality of patient care and subsequent patient outcomes. Mitra, Cameron, Mele, and Archer (2008) conducted a two-part study that examined the effects of restorative breaks on nurses’ fatigue levels and the overall performance level of the unit. These researchers found that restorative breaks significantly decreased nurses’ fatigue at the end of their shifts, and restorative breaks were associated with an improvement in several key performance indicators. In another study, Rogers, Hwang, and Scott (2004) examined the relationship between health care errors and work breaks among 393 hospital nurses. Although these researchers did not establish whether or not the absence of breaks had an effect on the rate of errors, they did show that longer breaks were associated with fewer errors compared with shorter breaks. They found a 10% decrease in the likelihood of error when nurses were given an additional 10 minutes for their meal and break periods per work shift.

Restorative Break Environments in Health Care Settings

Recently meta-analyses have showed a surge of scholarly interest in how physical environments can affect health care outcomes (Chaudhury, Mahmood, & Valente, 2009; Rechel, Buchan, & McKee, 2009; Ulrich et al., 2008). These reviews show extensive research on the impact of health care design on patients. However, the reviews also show that little is known about how different health care environments affect nursing staff. In 2008, Ulrich and colleagues concluded that only 25% of existing studies on health care environments took into account the experiences of nursing staff. Furthermore, they concluded that most of the studies on nursing staff only considered their experiences within the patient-care environment, without considering design issues in non-patient-care areas of health care facilities (e.g., the design of staff break rooms).

Rechel and colleagues (2009) conducted an extensive review of studies that analyzed the impact of health care facility design on staff. These researchers found very limited evidence on the topic, but the existing evidence revealed that better design could have a positive effect on nurses’ health, job performance, and desire to remain in the profession. Along with other design factors, these researchers emphasized the need for nurses to have personal space, privacy, and quiet time within the work environment. In 2011, Sadler and colleagues drew from existing studies to develop a business argument for building better staff break areas within health care facilities. These researchers also proposed that staff break areas should allow for private relaxation and reflection and listed this design goal as a priority in reducing nursing staff turnover. The next section reviews specific design interventions for establishing restorative environments in health care facility break areas.

Design Interventions for Staff Break Areas

This article focused on a handful of basic design interventions to improve staff break areas, including access to nature, daylight, and fresh air. These design features were chosen because of their relative simplicity and strong evidence regarding the effectiveness of these environmental features in other work settings (Aries, Veitch, & Newsham, 2010; Kaplan, 1993; Lottrup, Stigsdotter, Meilby, & Claudi, 2015; Lottrup, Stigsdotter, Meilby, & Corazon, 2012). This article also considered the relative effectiveness of full-physical access to the outdoors versus merely visual access through windows. Recent studies have compared the effectiveness of these design features in other institutional settings such as office workspaces (Largo-Wight, Chen, Dodd, & Weiler, 2011; Lottrup, Grahn, & Stigsdotter, 2013), but these investigations have not yet been extended to the health care industry. The therapeutic impacts of access to nature, daylight, and fresh air are discussed in more detail below.
Windowed Versus Windowless

Several previous studies have shown that workspaces without windows were associated with negative staff health effects and negative attitudes toward work. Researchers have found that employees in windowless offices expressed less job satisfaction and were significantly less positive in regard to their jobs, job perception, perceived quality of the physical working environment, and overall employment experience (Farley & Veitch, 2001; Finnegan & Solomon, 1981). Bringslimark, Hartig, and Patil (2011) studied the ways in which employees attempted to adapt to windowless environments. These researchers found that in windowless spaces, employees brought plants into their work environments at 5 times the rate of employees in windowed-work environments, suggesting they might have felt deprived of nature-related stimuli. In addition, the employees in windowless environments were 3 times more likely to bring pictures of nature into their workspaces.

Nature as a Positive Distraction

Multiple studies have shown that access to nature can reduce stress and provide restoration compared with purely human-made environments. Leather, Pyrgas, Beale, and Lawrence (1998) found that looking through windows to view natural elements such as trees and other vegetation reduced the negative impact of job stress. In a similar study, Shin (2007) interviewed 931 office workers and found that, regardless of other factors, workplaces with forest views were strongly associated with less job stress and more satisfaction. Dravigne, Waliczek, Lineberger, and Zajicek (2008) likewise found that staff who worked in offices with live plants and windows reported higher overall quality-of-life scores and better feelings about their work compared with staff who worked in offices without live plants and windows. Pati, Harvey, and Barach (2008) conducted a study on windows in a health care setting, measuring the restorative effects of exterior views on nurses’ stress levels and alertness. These researchers found that the more time nurses spent looking out windows, the less stress they experienced, and also the content of the view (nature vs. non-nature) mediated the extent of this stress-reduction effect.

In 2008, Kahn and colleagues conducted an intriguing study in which they compared the effects of an actual window (with a natural view), a plasma-screen displayed window (with a real-time view of nature), and a blank wall. To evaluate the effect of these different environments, the researchers measured heart-rate recovery times following low-level work-related stressors. The researchers found that the plasma-screen image of a window was no more restorative than a blank wall, but the actual window had significant restorative benefits. From this evidence, it appears that the human brain is not readily “tricked” into believing that it is in contact with other living organisms.

Daylight

A well-designed indoor/outdoor interface in staff break rooms can provide health-supporting benefits through exposure to ample daylight. Numerous studies have demonstrated the importance of sunlight in enhancing physical and psychological well-being. Daylight, absorbed through the retina and skin, regulates the nervous/endocrine systems and maintains circadian rhythms (Boyce, Hunter, & Howlett, 2003; Ott, 1990; Samuels, 1990; Wurtman, 1975). Moreover, daylight entering the retina can influence the function of the pituitary gland, which controls hormonal secretions. Melatonin, naturally secreted when there is an absence of daylight, can result in drowsiness, low levels of consciousness, and feelings of depression (Hollwich & Dieckhues, 1980; Ott Biolight Systems, Inc., 1997). Exposure to bright daylight, in contrast, can be an effective treatment for depression by controlling hormones and inducing serotonin secretion (Golden et al., 2005; Hollwich & Dieckhues, 1980).

Physical Access to the Outdoors and Fresh Air

The pheromones, oxygen levels, and negative ions found in fresh, natural air have been shown to enhance physical and psychological well-being. Tom, Poole, Galla, and Berrier (1981) evaluated the effect of negative ions in the air on human performance and mood. These researchers found that study participants in environments with higher negative air ions reported significantly higher energy levels and ease of concentration. Other studies have consistently shown improvements in health, work attitude, and satisfaction among employees who have regular access to outdoor environments, even when the physiological mechanisms of these improvements were not fully understood or carefully studied. For example, in a recent investigation, Lottrup, Grahn, and Stigsdotter (2013) found a significant relationship between physical access to workplace greenery and a positive workplace attitude. Study participants who had physical access to greenery had the most positive attitudes, followed by those participants who only had visual access to greenery, whereas those with no access to greenery at all exhibited the most negative attitudes.

A similar study was conducted in a health care setting by Faris, Stigsdotter, Lottrup, and Nilsson (2012). These researchers interviewed staff members who had access to an outdoor garden in their health care facility, and used it for short duration breaks during their shifts. The researchers found that the garden provided significant stress-relieving effects by allowing staff to step away from their regular work environments. In another qualitative study conducted in England, researchers collected anecdotal evidence of the restorative value of direct physical access to nature. One of the nurses who participated in the study noted, “It makes you happier to be working in a nice environment, pleasant view, sufficient daylight, and the possibility of opening a window for fresh air” (PriceWaterhouseCoopers LLP, 2004).

Summary

The existing literature related to the shortage of nurses in the United States, the high levels of burnout and turnover that
nurses currently experience, and the negative consequences of fatigue for both nursing staff and patients demonstrate the pressing need for interventions to improve working conditions for nurses. Additional literature on the restorative effects of breaks, and the value of well-designed break areas, suggests that efforts to improve breakroom design can play an important role in improving nurses’ job satisfaction and performance. Access to nature, daylight, and fresh air has been shown to be effective as well as straightforward design interventions across a wide variety of working environments. Further studies are needed to investigate how these environmental improvements can best be implemented in health care break rooms to foster nurses’ health and well-being and thereby allow them to provide the best possible care for their patients.

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References


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