JAMDA 26 (2025) 105326

JAMDA

journal homepage: www.jamda.com

Review Article

Designing LTC Physical Work Environments to Support Worker Well-being: A Review and Recommendations

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Keywords:
Long-term care
built environment
employee well-being
burnout
restorative design
workplace design

A B S T R A C T

Objectives: Well-designed, health-promoting physical work environments have the potential to reduce burnout and attrition for employees who work in long-term care (LTC) facilities. Unfortunately, there is limited existing guidance for LTC facility owners and operators related to specific health-promoting design strategies for LTC work environments. This narrative review aims to fill this knowledge gap.
Methods: Information was synthesized from healthy-building certification standards for health care and non–health care buildings, LTC design guidelines, academic studies, and expert commentaries. The review was conducted in 3 phases to (1) identify specific space types and design characteristics generally considered to be health-supportive, (2) gather existing research on the identified strategies to critically analyze their supportive value, and (3) communicate the findings to a broad audience of stakeholders.
Results: Five specific space types and 21 design characteristics were identified as both supportive of employee health and well-being, and relevant to LTC physical work environments.
Conclusions: When health care organizations construct new facilities or renovate existing facilities, using these health-promoting design strategies should be considered. Benefits of health-promoting physical work environments include better employee mental and physical health, less burnout, and less turnover. Reducing burnout and increasing employee retention is essential to mitigate the ongoing staffing crisis in the LTC industry.

The long-term care (LTC) workforce is experiencing historic levels of poor mental and physical health.[1–3] These circumstances have contributed to high rates of employee burnout, staff turnover, and labor shortages.[4–6] Many LTC facilities currently have turnover rates of 100% annually.[6] With the estimated cost of replacing just 1 LTC employee being between $3000 and $46,000, depending on the job role, the financial burden associated with current employee turnover is staggering.[7,8] In addition to the financial burden created by high rates of turnover, the lack of adequate staffing negatively impacts the quality of care for patient populations.[6,9] The staffing shortage is a public health crisis that needs to be addressed using a holistic approach focused on improving the well-being of employees, including creating and maintaining supportive physical work environments.[10,11]

Work "environments" commonly refer to psychosocial work environments (eg, level of social support, perceptions of control).[12] This approach has resulted in the development of wellness, or well-being, interventions that often focus on creating health-supportive policies and programs.[13] An important but often overlooked intervention strategy to foster employee well-being and retention is the creation of supportive *physical work environments* that work in tandem with psychosocial programming. When combined with positive psychosocial and workplace factors,

This research was supported by the U.S. Centers for Disease Control and Prevention National Institute for Occupational Safety and Health (1U19OH011227). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention or the Department of Health and Human Services.

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https://doi.org/10.1016/j.jamda.2024.105326
1525-8610/

supportive physical workspaces can provide areas of refuge from high-stress work environments, foster stronger employee relationships, encourage employee self-care practices, and communicate to employees that their health and well-being are a priority to their employers.[14,15]

Unfortunately, there is a lack of easily accessible guidance on how physical work environments in LTC facilities should be designed to support employee well-being. The National Institute of Occupational Safety and Health states that it is important to provide a "healthy workspace design and environment" as part of their Total Worker Health program but does not describe or articulate the design characteristics of "healthy" workspaces.[16] Healthy-building certification programs like the WELL Building Standard and Fitwel provide the most robust guidance on how to design health-promoting workplaces, but the information provided in these standards can be difficult for nondesign professionals to understand.[17,18] Scientific studies that investigate the relationship between buildings/spaces and the health of employees are easier to understand but often limit their scope of research to a single space characteristic (eg, daylight, access to nature).[19,20] The knowledge gained from existing articles is difficult to translate into the development of a user-friendly multifaceted approach with a goal of creating healthy physical environments. Last, the available resources related to the creation of "healthy" physical work environments typically focus on traditional office work environments and may not be relevant to the unique work environments in LTC facilities.

To address this gap in knowledge, we conducted a narrative review of "healthy" building certification guidelines, LTC design standards, and existing literature. The review identified the *types* of staff spaces that are considered supportive of employee well-being and assessed specific health-promoting design *characteristics*.

Background

Physical Work Environments and Employee Well-being

We define the "physical work environment" as all spaces that an employee routinely accesses during a typical workday. In LTC facilities, this definition includes primary workspaces (eg, private offices, nurse stations), staff support spaces (eg, break rooms, locker rooms), and shared spaces (eg, hallways, resident lounges). With LTC staff spending between 8 and 16 hours a day in their workplace, these environments have the potential to positively, or negatively, impact the health and well-being of employees.[15,21]

Health-promoting design strategies are increasingly being utilized by architects and interior designers when creating physical work environments.[21,22] Post-occupancy analysis of spaces intentionally designed to support the health of building occupants shows increases in productivity, reductions in absenteeism, and mitigation of negative health impacts related to high-stress work environments.[23–26]

Health-Promoting Space Types vs Health-Promoting Design Characteristics

The creation of health-promoting *space types* and the use of health-promoting *design characteristics* are distinctly different strategies that can be used synergistically or separately to support employee well-being. Although they are often used together to create supportive physical workspaces, it is important to understand that these 2 things are not the same.

In LTC facility buildings, a variety of *space types* are required to meet the needs of both the residents and the staff. Staff spaces include both *functional* and *support* spaces. *Functional* spaces like offices and nurse stations primarily serve as areas where employees complete their assigned work. *Support* spaces, on the other hand, are intended to serve the needs of staff when they are not working. Employee support spaces can include break rooms, outdoor break areas, lactation rooms, and privacy spaces.

The simple existence of specific *space types* does not guarantee that a physical work environment is health-promoting, even if "support" spaces exist in the facility. The *design characteristics* of both the functional and support spaces, on the other hand, matter a great deal.

In contrast to *space types, design characteristics* include finish material selections, indoor environmental quality (IEQ), furnishings and fixtures, and accessibility of spaces, as well as the ability for a space to be adapted to the personal needs or preferences of an occupant. Design characteristics often meet the basic needs of workers (eg, desk for working, refrigerator to store food) but do not directly support worker well-being.

Consider the staff break room *space type* that is provided in most LTC facilities. Whether or not the break room supports the health and well-being of employees depends a great deal on the *design characteristics* of the space. If the break room has windows that provide daylight, views, and comfortable furnishings, it is more likely that staff will use the space and benefit from its restorative nature. However, if the break room is in the basement with no daylight or views and is poorly furnished, it is less likely to be used and, when used, has less potential to positively impact the health and well-being of employees.

Methods

This cross-disciplinary narrative review of health-promoting design strategies synthesizes information from multiple sources including healthy-building rating systems for health care and non−health care buildings, LTC design guidelines, and academic studies. Resources were included from the fields of architecture/design, occupational health, medical science, and environmental psychology. Although our focus is on health care facilities, we have included reviews of resources associated with other types of workspaces because health-promoting design strategies are considered highly generalizable.[17] The review was conducted in 3 phases (Figure 1).

Phase 1

In phase 1, guidance from experts in the fields of architecture and health care design was leveraged to identify existing evidence-based resources that addressed best-practices related to the design and construction of health-supportive work environments. Ultimately, 5 of the identified standards/guidelines were deemed relevant to LTCF building types and used in the study: (1) The WELL Building Standard v2 (WELL), created and administered by the International Well Building Institute (IWBI); (2) Fitwel Workplace (Fitwel) guidelines, created and administered by The Center for Active Design; (3) Building Research Establishment Environmental Assessment Method V6.0 (BREEAM), created and administered by the Building Research Establishment; (4) Leadership in Energy and Environmental Design v4.1 BD + C (LEED), created and administered by the U.S. Green Building Council; and (5) Guidelines for Design and Construction of Residential Health, Care and Support Facilities 2022 Edition (FGI), which is administered by the Facility Guidelines Institute.[17,18,27–29] Using these resources, 13 health-supportive *space types* and 57 health-supportive *design characteristics* were identified (Supplementary Table 1).

Once the space types and design characteristics were identified, the findings were consolidated for clarity and assessed for their relevance to LTC environments. Similar space types (eg, outdoor

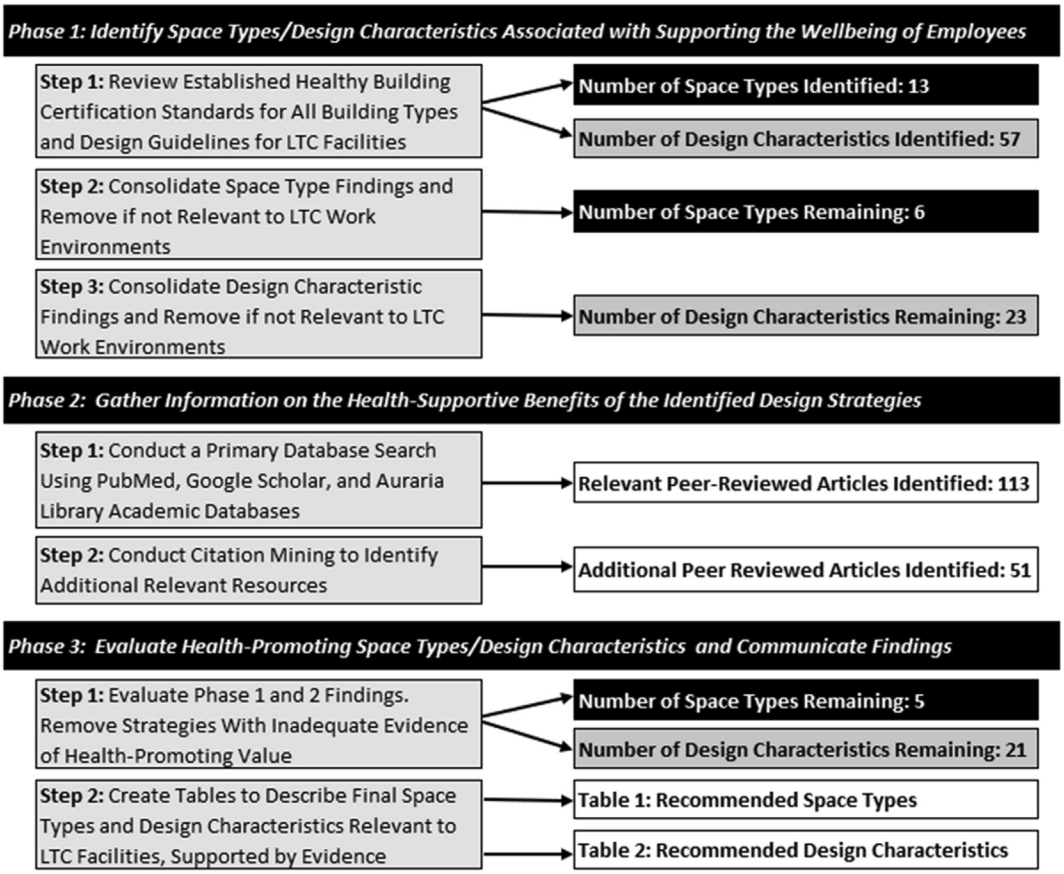

Fig. 1. The 3 phases used to identify evidence-based health-supportive space types (5) and design characteristics (21) relevant to physical work environments in LTC facilities.

space amenity, garden area) were combined into a single space type (outdoor break area). Spaces were removed from consideration that did not meet the following inclusion criteria: (1) recommended by more than 1 resource; (2) available for staff use regularly; or (3) relevant to work/break activities for LTC staff. Similar design characteristics (eg, glare control, flicker control) were combined into a single, more general, design characteristic (eg, good quality artificial light).

Phase 2

Phase 2 involved accessing peer-reviewed articles related to the health-promoting value of the space types and design characteristics identified in phase 1. Primary-database searches were conducted using PubMed, Auraria Library, and Google Scholar May to August 2023. Keywords used for searches included the following: employee, worker, staff, health, wellness, wellbeing, well-being, stress, anxiety, burnout, restorative, psychosocial, lighting, daylight, biophilia, "indoor air quality," "IAQ," "access to nature," noise, paint, colors, "total worker health," "staff supportive," "mental health," "healthy building*," "built environment," "physical environment," "Indoor Environmental Quality," "IEQ," "break room," "lactation room," "restorative space," "relaxation room," "relaxation space," "serenity room," "gender-inclusive," "outdoor break area," "workplace wellness." Citation mining from reports, articles, and white papers was used to supplement the database searches. After excluding studies that (1) did not provide data to support their findings, (2) did not provide findings relevant to employee well-being, or (3) were concerned with workplaces that were not located inside of buildings (eg, agricultural workers), 164 peer-reviewed articles were selected for inclusion.

Phase 3

In phase 3, findings were entered into a spreadsheet document to facilitate the analysis of the health-promoting *space types* and *design characteristics* that had been identified. The spreadsheet listed individual space types that were recommended or required in the building guidelines and standards, identified specific health-promoting design characteristics that each standard recommended or required for each space type, and referenced literature/studies related to the space type or design characteristic being considered.

Data were reviewed to identify physical work environment *space types* appropriate for LTC facilities. Space types that were not recommended by most of the guidelines were not considered relevant to LTC work environments and were removed from consideration. *Design characteristics* associated with the identified space types were removed from consideration if 2, or more, peer-reviewed articles demonstrating a positive correlation between the strategy and improved health or well-being could not be found. Remaining design characteristics were categorized as (1) making spaces enjoyable to occupy (Design for Comfort), or (2) supporting the mental and physical health of occupants (Design for Health Promotion) [Supplementary Table 1].

Results

Types of Spaces Recommended for LTC Work Environments

Table 1 summarizes the types of spaces recommended for inclusion in LTC facilities based on existing literature. Physical work environment *space types* fall into 2 main groupings: primary workspaces

Table 1
Summary Table Showing Recommended/Required Staff-Supportive Accessory Spaces for LTC Facilities

Space Type	Building Standard or Certification				
	Fitwel	WELL	BREEAM	LEED	FGI
Outdoor Break Area	Recommended	Recommended	Recommended	Recommended	Recommended
Break Room/Eating area	Recommended	Recommended	Recommended	Not addressed	Required
Restorative Space/Room	Recommended	Recommended	Recommended	Not addressed	Recommended
Lactation Room	Recommended	Recommended	Recommended	Not addressed	Recommended
Fitness Space/Room	Recommended	Recommended	Recommended	Not addressed	Not addressed

(PWSs) and staff support spaces (SSSs). The standards and guidelines that were reviewed in this study did not provide recommendations for specific PWS *types* (eg, private office, nurse station). Instead, they provided guidance for "all regularly occupied spaces," which encompasses all types of PWSs. However, each of the resources included information that did relate to the SSS *types* that should be provided to support the health and well-being of employee populations. Recommended SSS types included outdoor break areas, break rooms/eating areas, restorative spaces/rooms, lactation rooms, and fitness spaces/rooms. In the FGI Guidelines, newly constructed LTC facilities are only required to provide a single SSS space type, a staff break room/eating area.

Research reviewed in phase 2 of our study provided evidence that SSS positively impacts the well-being of employees in a variety of ways. Shared spaces that encourage employees to gather (break rooms, outdoor break areas, fitness areas) increased the frequency of worker breaks, helped create meaningful connections between employees and their coworkers, increased physical activity, and supported mindful eating practices.[30–37] Spaces that provided employees with the opportunity to have privacy during the workday (restorative

Table 2
Summary of Design Characteristics Demonstrated to Support Employee Health and Well-being

Characteristic Type	Relevant to Space Type	Building Standard/Certification	Supportive Studies
Design for Comfort			
Good Indoor Air Quality	All Regularly Occupied Spaces	WELL, Fitwel, LEED, BREEAM, FGI	Thach 2020 Allen 2016
Thermal Comfort Monitoring	All Regularly Occupied Spaces	WELL, LEED, BREEAM	AL Horr 2016 Nimlyat 2015
Good Quality Artificial Light	All Regularly Occupied Spaces	WELL, LEED, BREEAM	Colenberg 2021 AL Horr 2016
Shading Devices	Outdoor Break Areas	WELL, Fitwel, LEED	Nejati 2016 Nikolopoulou 2003
Comfortable/Ergonomic Furnishings	Work and Break Areas	WELL, Fitwel, FGI	Franke 2021 Nejati 2016
Design for Health Promotion			
Access to Daylight	All Regularly Occupied Spaces	WELL, Fitwel, LEED, BREEAM, FGI	Boubekri 2014 Shishegar 2016
Views of Nature	All Regularly Occupied Spaces	WELL, Fitwel, LEED, BREEAM, FGI	Nejati 2016 Largo-Wight 2011
Use of Biophelic Design	All Regularly Occupied Spaces	WELL, Fitwel, FGI	Largo-Wight 2011 Nejati 2016
Visual/Audio Privacy	Work and Break Areas	WELL, Fitwel	Nejati 2016 Veitch 2011
IEQ Controlled by Occupants	All Regularly Occupied Spaces	WELL, Fitwel, BREEAM	Bluyssen 2016 Nimlyat 2015
Food Preparation/Storage	Break Room/Area	WELL, Fitwel, FGI	Utter 2022 Lin 2012
Access to Drinking Water	All Regularly Occupied Spaces	WELL, Fitwel, BREEAM	Purvis 2020 Popkin 2010
Shower Facilities	Restrooms/Locker Rooms	WELL, Fitwel, LEED, BREEAM, FGI	Faderani 2020 Buehler 2012
Secured Storage/Lockers	Work and Break Areas	WELL, Fitwel, FGI	Buehler 2012 Rechel 2009
Inclusive Design: Disabled Accessible	All Regularly Occupied Spaces	WELL, BREEAM, FGI	Shore 2018 Konrad 2013
Inclusive Design: LGBTQ+	All Regularly Occupied Spaces	WELL, BREEAM, FGI	Owens 2022 Huffman 2021
Inclusive Design: Neurodiverse	All Regularly Occupied Spaces	WELL, BREEAM, FGI	Meacham 2021 Shore 2018
Inclusive Design: Celebrates Culture	All Regularly Occupied Spaces	WELL	Botchwey 2022 Phinney 2001
Inclusive Design: All Ages	All Regularly Occupied Spaces	WELL, BREEAM, FGI	Shore 2018 Jeong 2014
Inclusive Design: Individuals of Size	All Regularly Occupied Spaces	BREEAM	Shore 2018 Porter 2004
Inclusive Design: Multilingual	All Regularly Occupied Spaces	FGI	Shore 2018 Alsamadani 2013

rooms, lactation rooms) were found to decrease overall stress levels, support employee restoration and relaxation practices, and increase the rate of pumping for new mothers.[38–44]

Design Characteristics Recommended for LTC Work Environments

Phase 1 of this review identified 57 health-promoting design characteristics that were recommended for physical work environments (Supplementary Table 1). Phase 2 identified 164 key peer-reviewed articles that discussed the design characteristics being considered and characterized their impact on health and well-being. The phase 3 analysis determined that 21 of the identified design characteristics are both supported by empirical evidence and are relevant to LTC work environments (Table 2). Studies show that positive health outcomes associated with these health-promoting design characteristics include improved sleep duration and quality, lowered levels of depression and anxiety, improved eating habits, better hydration, and better recovery from job stress.[45–53] The design characteristics most supported by evidence, indicating that their use will positively impact the health and well-being of LTC employees, are described in the following sections.

Good indoor air quality

Indoor air that is comfortable, free of pollutants, and has a high percentage of clean outdoor air has been correlated with positive impacts on the physical and mental health of building occupants. Studies have demonstrated that good indoor air quality improves cognitive functioning, reduces stress, reduces fatigue, and improves employee productivity.[19,24,53–55]

Good quality artificial light

The design of artificial lighting should be tailored to each unique PWS and SSS as different spaces have different lighting needs related to brightness, color, and functionality. Exposure to poorly designed lighting (eg, creates glare) or lighting that is not maintained well (eg, flickers) has been associated with negative health outcomes including sleep disturbance, depression, weight gain, eating disorders, and elevated risks of cancer.[20,56–59]

Access to daylight

Increased exposure to daylight has been shown to result in better sleep, an improved sense of well-being, more physical activity, and fewer symptoms associated with anxiety, depression, and stress.[60–63]

Use of biophilic design

Integration of biophilic design, the use of natural elements like plants or organic materials, in work environments has been positively correlated with decreased depression and anxiety, increased psychological well-being, better recovery from job stress, increased physical activity, and more connection between employees.[64–69]

Visual/Audio privacy

Studies of workplace wellness indicate that employees have a strong desire for privacy.[21,23] Privacy allows people to control how much information others around them have about their lives, provides separation between employees and coworkers or patients/residents, and supports the free expression of emotions without the fear of judgment.[21,70]

Controllability of the indoor environment

Actual, or perceived, control over indoor environmental conditions has been positively associated with both employee comfort and well-being.[54] A "one-size-fits-all" approach to designing indoor environments cannot meet the needs of all employees. Not only do individuals have significantly different preferences, the same person, at various times, will have different needs.[66] PWSs, as well as SSSs should be as adaptable as possible to allow for individual control of light levels, air flow, temperature, and workstation design.[71–74]

Inclusive design (eg, Americans with Disabilities Act, LGBTQIA+)

The design of a work environment communicates an organization's culture regarding diversity and inclusion. For example, if health-promoting supportive spaces are not provided and female employees must pump milk in a supply room or Muslim individuals need to perform their daily prayers in a janitor's closet, the message from the organization to the employees is that unique identities and needs are not important. The degree to which a person feels appreciated and accepted in their daily environment has been shown to significantly impact mental and physical health.[75–85] Health impacts can be immediate or long-term. Immediate impacts include the heightened anxiety a non-binary individual feels when required to use a gender-specific bathroom.[78] Long-term impacts include the propagation of "invisibility syndrome" which is a psychological condition created when a person perceives that their identity is not seen or valued.[75,86] Studies show that noninclusive environments lead to a variety of poor health outcomes including depression, anxiety, and suicidal ideations.[87] In contrast, places and circumstances that provide sense of acceptance and legitimacy can improve health outcomes.[86]

Implications for Practice, Policy, and Research

Practice

Studies across industries establish the importance of physical workspaces that support the mental and physical health of employees, and this review emphasizes the specific importance of those considerations in LTC work environments. When new LTC facilities are constructed, or existing facilities are renovated, decision makers and their teams of design experts need to work collaboratively to champion designs that improve the health and well-being of employees. This includes creating restorative spaces with health-supportive design characteristics (eg, daylight, natural elements, inclusive design). Space types that support peer interactions (eg, breakrooms, outdoor break spaces) and space types that support employees' need for privacy and autonomy (eg, restorative/privacy room, lactation room) should be provided, when possible. Although initial construction costs may be higher if health-promoting design strategies are included, these up-front costs need to be weighed against the potential for cost savings that would be realized with lower employee burnout and staff turnover rates.

Policy

The Facility Guidelines Institute (FGI) has developed a suite of "guidelines" that provide requirements/guidance for the planning, designing, and construction of specific types of healthcare facilities. Compliance with all, or part, of the FGI *Guidelines* is required by 43 states.[29] The FGI *Guidelines for Design and Construction of Residential Health, Care, and Support Facilities* are directly applicable to LTC facilities. Unfortunately, these *Guidelines* have very limited requirements related to physical work environments that focus on supporting the health and well-being of employees. The supportive spaces and space characteristics referenced in this review as "FGI" are typically included in the *Guidelines* as "appendix text" which indicates that they are not fundamental requirements. This is a missed opportunity. Future versions of the FGI *Guidelines* should be updated to require that evidence-based health-promoting physical work environment design strategies be used in the design and construction of all new LTC facilities. With the high levels of burnout being experienced by health care professionals, it is critical that established design guidelines focus on the health and well-being of staff as much as they consider strategies that support the health and well-being of patients.

Future research

There has been considerable research about the impact that health-promoting work environments have on office workers and patient populations.[15,19,20] Although many of the design concepts cited in those studies are highly generalizable, as shown in this review, there is a lack of research on the impact that these same design interventions have on LTC workforce populations. Future research efforts to systematically assess LTC facilities in relation to employee health and well-being are needed to evaluate the recommendations identified in this review. This work should be done in parallel with ongoing research focused on the impact that "healthy-building" design has on the mental and physical health of patients and visitors in health care environments. It is important that LTC facilities strive to meet the physical and psychological needs of the various populations that occupy the buildings on a regular basis whether an individual identifies the building as their long-term home, a short-term recovery location, a place of work, or a destination where they visit loved ones. Cross-disciplinary research involving collaboration among academic institutions, private design firms, and LTC industry leaders will strengthen this assessment. Health-promoting space types and design characteristics cannot be evaluated if LTC organizations do not embrace the potential of these strategies, allowing the applications to be evaluated in situ by researchers. This review is part of a larger study that is seeking to assess the impact that high quality staff-supportive physical work environments have on LTC employee health and well-being. In the next phase of our larger study, an audit tool will be developed to objectively characterize the quality of PWSs and SSSs in LTC facilities. Employees in the facilities will be surveyed to determine their perceptions of their physical work environments, how they use existing SSSs, and their overall well-being. Analysis of the LTC facility audit results and the employee survey results will create a model for future studies interested in researching the association between physical work environments and employee well-being.

Limitations

It is important to acknowledge that this review had limitations. The review relied heavily on the guidance provided in existing healthy-building certification standards to help identify health-promoting space types and design characteristics relevant to physical work environments. The prominent standards (WELL, Fitwel) were created to be highly generalizable to a variety of building types and may not have included strategies specific to LTC environments. The analysis of the identified health-promoting design strategies was limited because built environment studies typically focus on office-based work environments instead of LTC workplaces; many of the studies had small study populations; and some design strategies have received very little attention from researchers. These limitations highlight the need for more research focused on the impact of health-promoting physical work environments specific to the well-being of employees who work in LTC facilities.

Conclusion

This is the first review to synthesize information and provide recommendations for space types and design characteristics to foster health-promoting physical work environments in LTC facilities. Unfortunately, there is limited existing guidance for LTC facility owners and operators on this topic. This review identified 5 *space types* and 21 *design characteristics* that can be used in LTC facilities to support the health and well-being of employees. The implementation of these health-promoting design strategies does not need to be confusing nor cost-prohibitive. Many of the *space types* and *design characteristics* discussed in this review likely feel familiar because they can easily be seen in our daily lives. We take walks outdoors because being around nature helps us relax. We seek out spaces that reflect our culture, heritage, and values because a sense of belonging is important. There is no reason that these same strategies (access to daylight, biophilic design, and inclusive environments) and many others, cannot be integrated into LTC physical work environments. Access to daylight can be improved if opaque window shading devices are replaced with translucent fabric, still providing privacy while also allowing daylight into the space. Biophilic design can be achieved by adding plants and other natural elements to spaces throughout the building. Creating inclusive environments can be as simple as replacing a gendered single-user bathroom sign with a sign that does not classify users as binary (male or female). In many ways, using health-promoting built environment strategies are "low-hanging fruit" when considering interventions designed to improve employee health and well-being. The findings from this study help fill a gap in knowledge around health-promoting design and can serve as a starting point to help LTC organizations better understand which specific *space types* and *design characteristics* have the potential to benefit their unique workforces. With the high rates of burnout experienced by LTC employees, organizations need to prioritize interventions that will improve the health and well-being of LTC employees, including providing them with health-promoting physical work environments.

Disclosure

The authors declare no conflict of interest.

Supplementary Data

Supplementary data related to this article can be found online at https://doi.org/10.1016/j.jamda.2024.105326.

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