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Published

2023

Journal Title

Journal of Clinical Nursing

Version

Version of Record (VoR)

DOI

10.1111/jocn.16824

Received: 17 February 2023 | Revised: 3 June 2023 | Accepted: 4 July 2023

DOI: 10.1111/jocn.16824

Journal of Clinical Nursing WILEY

REVIEW

Nurses' work experiences in hospital wards with single rooms: An integrative review

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Abstract

Aim and objective: To evaluate evidence that examined nurses' work experiences in hospital wards with single rooms. The research question was 'What does the research tell us about nurses' work experiences in hospital wards with single rooms?'

Background: In the last decades, new hospital builds have moved towards including a high proportion of single rooms. Yet, single rooms create 'complex environments' that impact the nurses.

Design: A structured integrative review was undertaken of empirical evidence.

Methods: Original, peer-reviewed articles, written in English, were sourced from four databases: CINAHL, PubMed, Embase and Web of Science. The initial searches were performed in April 2021 and repeated in December 2022. Quality appraisal was

undertaken using the Mixed Methods Appraisal Tool. A narrative synthesis approach was used to analyse the data. Reporting was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.

Results: Twelve studies, published between 2006 and 2022, with an international origin, and representing n = 826 nurses, were included in this review. The synthesis revealed mixed perspectives about nurses' work experiences in wards with single rooms. Whilst single rooms are 'all good in theory (and) a good idea', the reality was quite different. Synthesised findings are presented in four categories: (i) aesthetics and the physical space, (ii) privacy vs. isolation, (iii) safety, which includes situational awareness and (iv) communication and collaboration.

Conclusion: This review describes how single rooms affects nurses' work experience. Whilst nurses shared multiple concerns about single rooms and the challenges they also acknowledged patient preference for the privacy and space afforded by single rooms.

Relevance to Clinical Practice: Findings from this review highlight the need for careful planning to maintain and strengthen teamwork, prevent nurses' sense of working in isolation, as well as creating opportunities for mentorship, and collaboration among nurses when working in single-room settings.

KEYWORDS
collaboration, hospitals, nurse, nursing, review, teamwork, ward design

1 | INTRODUCTION AND BACKGROUND

Hospitals have historically been designed in keeping with Florence Nightingale's *Environmental Theory*, centred on configuring the environment to support the provision of patient care (Gonzalo & Wayne, 2021). Wards were designed with open-plan multiple occupancy rooms which enabled nurses to have optimal visual surveillance (Gonzalo & Wayne, 2021). Multioccupancy rooms have also been commonplace in hospitals worldwide (Hutton, 2004).

Hospital design can play an important role in achieving high-quality patient care whilst balancing cost-effectiveness (Andrade et al., 2017; Laursen et al., 2014), and the link between hospital design strategies and users' well-being (Brambilla et al., 2019). In the last few decades, new hospital builds and refurbishments have moved towards including a high proportion of single rooms (Shannon et al., 2020; Taylor et al., 2018). Yet, single rooms create 'complex environments' with an interplay of physical, psychological, social and design elements that impact the patient, their family and nurses (Brambilla et al., 2019; Salonen et al., 2013; Shannon et al., 2020; Søndergaard et al., 2021; Ulrich et al., 2004, 2008). The shift to single rooms is largely based on the assumption that single rooms improve patient privacy, provide dignity and increased opportunities for family involvement during a hospital admission (Choi & Bosch, 2013; Florey et al., 2009; Shannon et al., 2020; Wong et al., 2021). Other benefits attributed to single rooms include improved infection prevention and control and decreased infection rates (Voigt et al., 2018) as well as enabling nurses to tailor the environment to the patient's preference, thereby providing person-centred care (Huisman et al., 2012; Søndergaard et al., 2021; Taylor et al., 2018; Voigt et al., 2018).

However, some studies have identified disadvantages of single rooms including nurses' workload associated with increased walking distances (Søndergaard et al., 2021), adverse effects on nurses' work (Marcheschi et al., 2021; Søndergaard et al., 2021) and job satisfaction (Marcheschi et al., 2021; Ulrich et al., 2008). The potential influence of the work environment and how nurses experience working in it has not been comprehensively explored in the literature. Hence, there is a need for a review that examines the impact of single rooms on nurses' work experience.

What does this paper contribute to the wider global community?

Findings from this review highlight the need for careful planning to maintain and strengthen teamwork, prevent nurses' sense of working in isolation, as well as creating opportunities for mentorship, and collaboration among nurses when working in single-room accommodation settings.

1.1 | Aim

The aim of this integrative review was to evaluate current evidence that examined nurses' work experiences in hospital wards with single rooms. The question guiding this review was as follows: What does research tell us about nurses' work experiences in hospital wards with single rooms?

1.2 | Design and method

A structured integrative review was undertaken of empirical evidence based on the methodology as proposed by Whittemore and Knafl (Whittemore & Knafl, 2005). This enabled the review and inclusion of a broad range of qualitative and quantitative methodologies. Data were consequently extracted and evaluated using a standardised data collection sheet. Reporting was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Page et al., 2021; File S1).

1.3 | Search methods

A broad search strategy was developed using the PEO framework, where P was acute hospital nurses, E was single rooms, and O was nurses´ work experiences. Keywords and MESH terms were utilised using common Boolean operators as shown in Table 1.

An a priori list of inclusion and exclusion criteria, agreed upon by all investigators, were created to guide assessment of papers for inclusion (Table 2).

The initial database search was run across all databases in April 2021 and re-run in December 2022. No date limit was applied to the search, as our goal was to capture all relevant research evidence. An example of the CINAHL database search is provided in File S2.

1.4 | Screening

A total of 2836 papers were identified by the initial search. Results from all searches were exported into Covidence (2022) for screening and selection, with all authors contributing equally. Each paper was screened independently by two authors, with discrepancies resolved through consensus. After removal of duplicates, there were 1644 papers. After title and abstract review, there were 47 papers eligible for full text review. After full text review, there were 10 papers identified for inclusion in the review. When the database searches were re-run in December, 2022, an additional two papers were assessed as eligible for inclusion, resulted in 12 papers being included in this review (Figure 1).

1.5 | Search outcome and data extraction

Two reviewers (DK and MB) independently extracted data including the author, year, country, study aim, design, setting, sample, measures or data collection methods and key findings. Data relevant to the review question were entered into an Excel spreadsheet for management and synthesis.

1.6 | Quality appraisal

For all papers, two authors assessed the methodological quality independently using the Mixed Methods Appraisal Tool (MMAT), which is designed for use in systematic, mixed-methods studies to critically appraise quantitative, qualitative and mixed-methods original studies (Hong et al., 2018). This MMAT allows concomitant critical appraisal for use with the most common types of empirical studies. For each type of study design (e.g. qualitative, quantitative randomised controlled studies, quantitative non-randomised, quantitative descriptive and mixed methods), there is a set of corresponding criteria that are used to appraise the quality of each study. For papers included in the review, an MMAT Quality Appraisal Score was calculated as a total score out of 7, as shown in Table 3. Rationales for scores not achieving a score of 7 were also detailed.

1.7 | Data analysis

Narrative synthesis, an approach that relies primarily on the use of words to explain and summarise synthesis findings (Popay et al., 2006), was used to analyse the data, and to summarise heterogenous study findings. Included papers were read line by line. Patterns and relationships that addressed the research question were identified and compared using an iterative process. Synthesis

TABLE 1 Presentation of search terms.

Keywords	single room*, single patient room*, private room*, private patient room*, single occupan*, single bed, evidence-based design, evidence-based hospital design	work practice*, working practice*, work pattern*, working pattern*, work environment*, working environment*, work setting*, work condition*, working condition*, usage pattern*, practice pattern*, ways of work*, workflow*, workplace, workload, stress*, teamwork, physical environment, staff security, staff safety, job satisfaction, work satisfaction, care delivery
MESH headings	"Patients' rooms" [MeSH], "Hospital design and construction" [MeSH Terms]	"Workload" [Mesh], "Workplace" [MeSH], "Nursing Staff, Hospital/psychology" [Mesh], "Practice patterns, Nurses" [MeSH], "Job satisfaction" [MeSH], "Stress, psychological" [MeSH]

TABLE 2 Presentation of inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
Original research	Reviews including systematic, integrative, literature or scoping
Written in English	Opinion or editorial papers
Peer-reviewed journal publication	Papers that report from non-traditional ward settings, for example intensive care and coronary care
Focus was related to work-related factors or the physical environment or psychological issues or interventions used or staff experiences of work environmental issues	Papers that include data related to single and shared room accommodation where the data are not separated
Hospital nurses	
Single-room patient accommodation on general wards in public and private hospitals	

was initially undertaken by one author (MJB), then reviewed by the rest of the team, with differences and disagreements discussed until the final synthesised findings were determined. Text was used to emphasise similarities within and between the studies.

1.8 | Findings

Twelve studies, published between 2006 and 2022, were included in this review. Six were conducted in the United States of America (USA) (Berry & Parish, 2008; Chaudhury et al., 2006; Deitrick et al., 2010; Raj et al., 2022; Real et al., 2017; Trzpuc & Martin, 2010), three in the United Kingdom (Donetto et al., 2017; Kelly et al., 2022; Maben et al., 2016), two in Australia (Bloomer et al., 2016; Cusack et al., 2019) and one in Sweden (Rosén et al., 2017). The included studies were heterogenous in design, using various data collection approaches including survey, interview, focus groups, observation, photograph or floor plan analysis, pedometer readings and nested case study.

Collectively, aside from the data related to other participant groups, findings were generated from 828 nursing personnel. Characteristics of the included studies are presented in Table 4. Quality appraisal scores for the included studies ranged from 5 to 7 (out of 7). Whilst there was some variation in the quality of included papers, an a priori was made to not exclude papers on the basis of quality appraisal.

The synthesis revealed mixed perspectives about the nursing work environment in single-room patient accommodation (referred to as single rooms) in hospitals. Whilst single rooms are 'all good in theory (and)… a good idea' (Real et al., 2017, p. 1565), the reality was quite different. Synthesised findings are presented in four themes: (i) aesthetics and the physical space, (ii) privacy vs. isolation, (iii) safety, which includes situational awareness and (iv) communication and collaboration.

1.8.1 | Aesthetics and the physical space

In eight studies (Berry & Parish, 2008; Chaudhury et al., 2006; Cusack et al., 2019; Kelly et al., 2022; Maben et al., 2016; Raj et al., 2022; Real et al., 2017; Rosén et al., 2017), data revealed nurse participants' perspectives on the aesthetics of single rooms and their perceptions of working within the physical space, often through comparison with other unit/ward designs with multiple occupancy patient accommodation, referred to as multiple occupancy rooms. Four studies, in whole or part, provided some comparison of nurses' perspectives on single rooms compared to multiple occupancy rooms, one from the UK which used a multimethod case study approach (Maben et al., 2016), one used focus groups (Kelly et al., 2022) and two studies used surveys (Berry & Parish, 2008; Chaudhury et al., 2006). Whilst nurses in the UK study by Maben et al. (2016) stated they preferred a mix of single and multiple occupancy rooms in a ward, the proximity to resources and equipment within or adjacent to each room was appreciated, as a junior sister explained:

> …the gloves on the wall, just outside the general patients' room, the gloves, alcohol dispenser, aprons, and the wipes […] they're very clean, clear, easy to refill and they really benefit from being where they are, which is perfect, the fact that they're outside every single patient's room, there's no question about it.
>
> junior sister, older people ward
> (Maben et al., 2016, p. 249).

Nurses viewed single rooms positively in terms of overall patient comfort (Cusack et al., 2019; Kelly et al., 2022; Raj et al., 2022), pleasantness and quality of nurse workspace (Berry & Parish, 2008), layout, amenities (Chaudhury et al., 2006; Kelly et al., 2022) and temperature, lighting and noise control (Chaudhury et al., 2006). The flexibility and space that single rooms provided for family members (Chaudhury et al., 2006; Cusack et al., 2019) were also reported as a positive feature of single rooms. Single rooms were also preferred because there was more room to do charting (Real et al., 2017), there was no need for bed moves for infection control purposes (Rosén et al., 2017), and they ensured nurses were closer to their patients

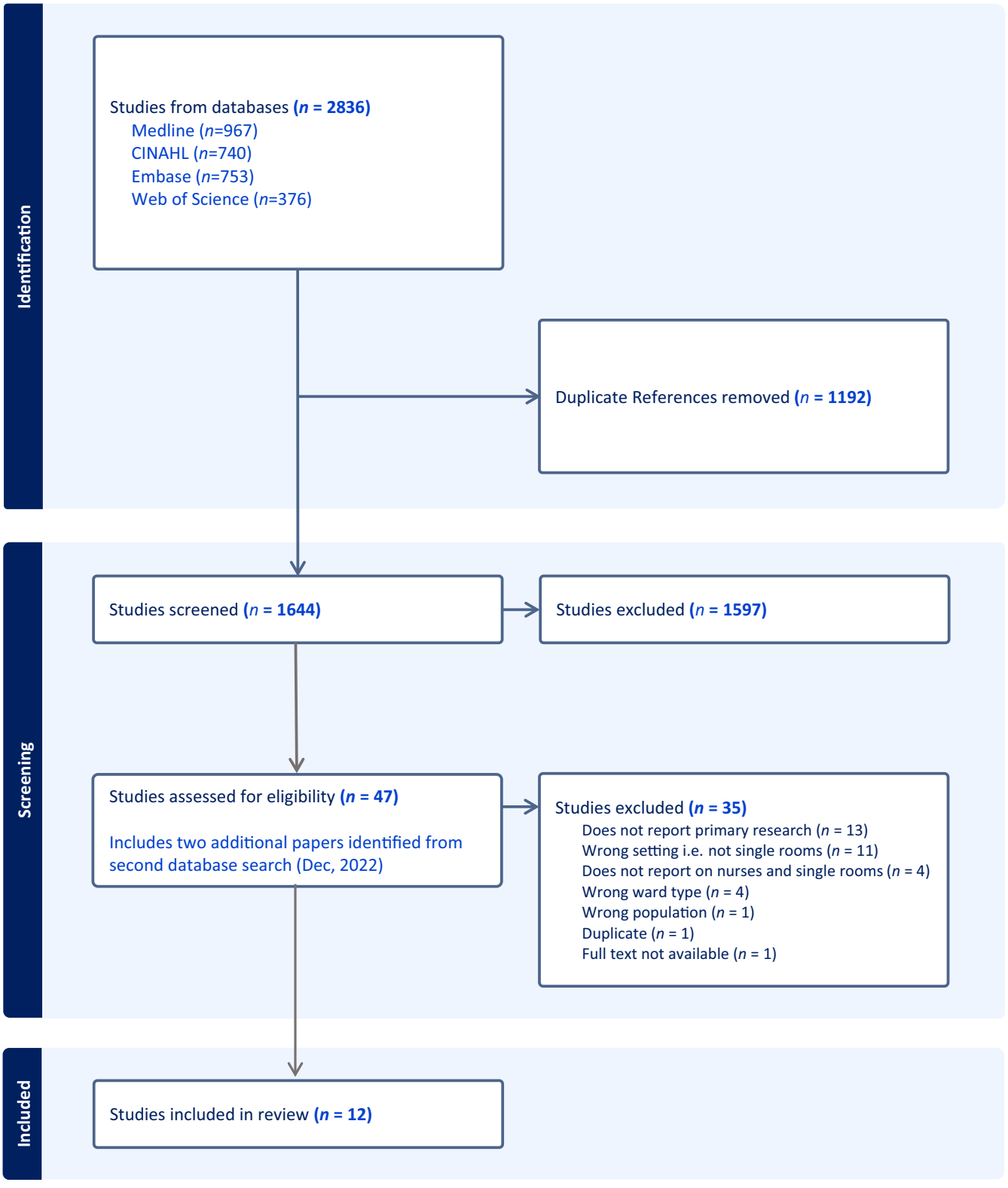

FIGURE 1 PRISMA.

(Real et al., 2017). Access to outdoor gardens was also reported as a positive feature, thought to enhance their emotional and spiritual wellness (Raj et al., 2022).

Several negative aspects associated with single rooms were also identified. Nurses felt single-room design emphasised a hotel culture where '…It's like a hotel and we're serving them' (Kelly et al., 2022,

TABLE 3 Presentation of the quality appraisal.

References	MMAT Quality Appraisal Score (out of 7)	Critical appraisal comments
Berry and Parish (2008)	5	Divergencies and inconsistencies between qualitative and quantitative data were not adequately addressed. Each component did not adhere to the quality criteria for each tradition of the methods involved
Bloomer et al. (2016)	7	–
Chaudhury et al. (2006)	6	Incomplete statistical analysis
Cusack et al. (2019)	6	Divergencies and inconsistencies between qualitative and quantitative data were not adequately addressed
Deitrick et al. (2010)	7	–
Donetto et al. (2017)	7	–
Kelly et al. (2021)	7	–
Maben et al. (2016)	7	–
Raj et al. (2022)	7	–
Real et al. (2017)	6	Each component did not adhere to the quality criteria for the methods involved
Rosén et al. (2017)	7	–
Trzpuc and Martin (2010)	6	Divergencies and inconsistencies between qualitative and quantitative data were not adequately addressed

p. 2926). Concerns were also raised about increased walking distances (Cusack et al., 2019; Real et al., 2017), lack of space to seek refuge or respite following an emotional or challenging patient encounter (Raj et al., 2022), increased time spent visiting each patient room along long hallways (Rosén et al., 2017) and increased separation (Raj et al., 2022). Nurses also suggested that more time was spent in each single room talking to patients:

> …because you can really concentrate on your patient and you can have good communication with your patient without any distraction, but you probably are in there for maybe a lot longer… than if they'd been on an open ward… And people do keep you in there for quite a long time.
>
> surgical ward, post-move
> (Donetto et al., 2017, p. 127).

1.8.2 | Patient privacy versus isolation

Six of the included studies exemplify the tension between promoting privacy for patients and their family, and the risk of patient isolation (Bloomer et al., 2016; Chaudhury et al., 2006; Cusack et al., 2019; Donetto et al., 2017; Raj et al., 2022; Rosén et al., 2017). Two studies demonstrate nurses' preference for single rooms for patients who are agitated or who may be intrusive to other patients (Bloomer et al., 2016; Cusack et al., 2019), for patients who were dying, and for themselves if they were to be hospitalised because of the additional privacy single rooms provided (Bloomer et al., 2016).

> …someone in a private room has an elevated level of privacy and dignity compared to someone who shares a room… ultimately it's providing them an increased level of [privacy], whether it be for discussions with health professionals… they've got walls, it's not the curtain.
>
> Interview 2, rehabilitation, site C
> (Bloomer et al., 2016, p. 2207).

Nurses suggested single rooms enhanced confidentiality (Cusack et al., 2019) and enabled nurses to be '…totally focused on one patient without interruptions' (Chaudhury et al., 2006, p. 123), because there was no roommate who could insist on attention (Rosén et al., 2017). Greater opportunity for discrete and uninterrupted private conversations (Chaudhury et al., 2006; Donetto et al., 2017; Raj et al., 2022) and to talk about sensitive issues (Rosén et al., 2017) were considered to enhance patient privacy.

However, single rooms were not considered suitable for everybody (Bloomer et al., 2016). The need for patients, particularly older people to interact with others for social contact (Bloomer et al., 2016; Cusack et al., 2019), and to counter isolation, boredom and loneliness, was considered greater than their need for privacy (Bloomer et al., 2016). This concern was exemplified by a participant in another study who, in comparing her experiences before and after a move from multiple occupancy to single-room accommodation reflect that 'I do find the patients are more chatty because I think

TABLE 4 Characteristics of the included studies.

References	Country, setting and context	Aim and/or research question/s	Methodology and method	Sample and sample size	Findings pertaining to original aim/research questions (primary outcomes)
Berry and Parish (2008)	USA 210-bed hospital that offers emergency, inpatient, out-patient and critical care services	To assess differences in nurse perceptions of facility design, according to quality of patient areas, quality of nurse workspaces, safety, and facility pleasantness	Descriptive study Survey using Likert type questions using existing scales to measure items grouped into 10 labels. Informal focus groups were undertaken to gain additional context	RNs and licensed nurses Round one ($N=235$) representing a response rate of 49%. Round two ($N=266$) representing a response rate of 55%	Significant differences were found between round 1 and 2 for quality of patient rooms, safety, pleasantness, quality of workspace, job stress, job satisfaction and service quality. Hospital design may impact nurses' job satisfaction and stress, and intention to leave
Bloomer et al. (2016)	Australia 370 bed public health service in Melbourne, with inpatient acute and subacute rehabilitation and geriatric beds; excl. paediatric, maternity, mental health, critical and palliative care	To measure occupancy rates, use of single vs. shared rooms; single-room usage patterns; to explore the practice, rationale and decision-making for single-room allocation	Sequential exploratory design researcher in-person survey and interviews	Daily survey—RNs ($n=12$), who were in-charge and were bed occupancy decision-makers. Interviews—RNs ($n=16$) who worked as bed allocation managers, nurse unit managers ($n=5$) and associate unit managers ($n=3$), hospital coordinators ($n=4$) and in-charge nurses ($n=4$)	Total bed occupancy did not fall below 99.4% during the period of data collection. Infection control was the primary reason for patients to be allocated to a single room; however, the patterns varied according to ward type and single-room availability. For occupancy decision-makers, decisions about patient allocation were a complex and challenging process, influenced and complicated by numerous factors including occupancy rates, the infection status of the patient/s, funding and patient/family preference. Bed moves were common resulting from frequent re-evaluation of need
Chaudhury et al. (2006)	USA Four hospitals in Washington and Oregon	To explore nurses' perception of single occupancy versus multioccupancy patient rooms in medical–surgical units	Descriptive study Survey to collect data on patient care, management, infection control issues, layout of the room, storage space, heating and cooling	Administrative ($n=4$) and nursing staff ($n=77$)	Single rooms were favoured over double-occupancy rooms in terms of appropriateness for patient examination, interaction with or accommodation of family members, and lower probability of dietary mix-ups
Cusack et al. (2019)	Australia Large government hospital four medical/surgical wards with 100% occupancy single rooms in Adelaide	To identify the advantages and disadvantages of a move to a new hospital with 100% single occupancy rooms	Mixed methods study with nested case studies ($n=4$). Survey examining current ward layout, move to 100% single rooms, most recent shift, job satisfaction, teamwork and safety, and demographics. Interviews with ($n=16$)	Nurses ($N=61$) and patients participated in a survey. Nurses ($n=16$) participated in interviews	The current environment was considered too crowded for nurses to carry out their work activities in the nurses station and when providing care at the patient's bedside. The current environment was thought to create additional work due to constantly moving patient beds around the ward, which staff anticipated may be mitigated in a single bed room hospital

(Continues)

TABLE 4 (Continued)

References	Country, setting and context	Aim and/or research question/s	Methodology and method	Sample and sample size	Findings pertaining to original aim/research questions (primary outcomes)
Deitrick et al. (2010)	USA Two medical/surgical units in one network. Unit One is a 30-bed orthopaedic/ neurological surgical unit with all private rooms. Unit two is a 32-bed orthopaedic/ surgical unit with double and private rooms	To understand how the process of nurse/patient communication via call bells is affected by the change to single-patient rooms	Ethnographic, grounded theory mixed method approach. Ethnographic observations were conducted across all shifts. Both units were photographed and mapped	Interviews were conducted with 13 staff in Unit 1, 16 staff in Unit 2, and patients. Staff included unit leadership, nurses, technical partners and unit secretaries	The staff on Unit 1 functioned like dancers in a well-organised, choreographed ballet when answering call lights, and were seen answering call lights more often than Unit 2. Staff on Unit 2 appeared less organised in their approach to answering call bells, and it was clearly the technical partners who answered call lights most often
Donetto et al. (2017)	United Kingdom Two acute NHS hospital wards	To explore the sensory dimensions of nursing staff's experiences of their working practices and the effect of the built environment upon these	Secondary analysis of interview data and photographs from a previous mixed methods quasi-experimental study	Nursing staff ($n=25$) from the acute assessment unit and general surgical ward (n=12) interviews were from before the move, and ($n=13$) from after	The single-room ward design prioritises focused vision and hinders peripheral perception, whilst the open ward environment is rich in contextual and preconscious information. Three key dimensions of sensory experience were affected by the change in ward design: (1) the ways in which nursing staff were able to see and hear patients on their ward; (2) the extent to which nursing staff were aware of colleagues' presence and workload on the ward; (3) the extent to which nursing staff could be seen and heard by patients
Kelly et al. (2021)	UK New ward block in a large district hospital, laid out in an L shape with each ward comprised on 24 beds in all single bedrooms	To explore the influence of a single room, acute-care environment on person-centred practice from the perspectives of patients and staff	Ethnography Non-participant observations in practice. Participatory reflective groups, and reflective journalling	Patient interviews ($n=9$) Non-participant observation of 138 staff Reflective group sessions with 14 Registered Nurses and Nursing Assistants	Staff and patients' views converged around visibility and isolation. Patients appreciated the privacy afforded by the single rooms, whilst staff experienced a psychological shift, being viewed (and viewing themselves) as 'visitors'. There was space for more sympathetic presence, encouraging patients to speak more openly, to facilitate knowing and authentic engagement. However, time remained an issue resulting in more task focused care
Maben et al. (2016)	United Kingdom Turnbridge Wells Hospital, in the NHS	To identify the impact of the move to a newly built acute NHS hospital with single rooms on staff and patient experience, patient safety and costs	Mixed methods pre/ post comparison within four nested case study wards; quasi-experimental pre/post study with 2 control hospitals; and analysis of capital and operational costs associated with single rooms. Interviews, surveys and pedometer data were collected	Ward staff (midwife, RNs and healthcare assistants) ($n=24$) and others including senior managers, medical and allied health clinicians, ward administrative staff, those in charge of the build or move, and patients	Two-thirds of patients expressed a preference for single rooms with comfort and control outweighing sense of isolation. Patients appreciated privacy, confidentiality and flexibility for visitors afforded by single rooms. Staff perceived improvements (patient comfort and confidentiality), but single rooms were worse for visibility, surveillance, teamwork, monitoring and safety. Staff walking distances increased significantly post move. An increase of falls and medication errors in one ward was likely to be associated with the need to adjust work patterns. Single rooms can cost 5% more with higher housekeeping and cleaning costs

TABLE 4 (Continued)

References	Country, setting and context	Aim and/or research question/s	Methodology and method	Sample and sample size	Findings pertaining to original aim/research questions (primary outcomes)
Raj et al. (2022)	USA County public safety net hospital, with units consisting of 36 single-patient rooms	To understand how evidence-based design strategies are related to aspects of nurse wellness	Exploratory qualitative study Semi-structured focus groups ($n=5$)	Nursing staff ($n=46$) and managers ($n=17$)	Environmental factors including facility size, break rooms and decentralised workstations were linked to social, emotional/spiritual, physical, intellectual and occupational aspects of wellness
Real et al. (2017)	USA Newly built urban, trauma-1 level hospital with neuroscience, stroke, trauma surgery, general surgery and orthopaedics	To investigate the relationship between a hospital's structure, communication and patient care processes, and the delivery of patient care (outcomes)	Multimethod study Focus groups interviews ($n=9$)	Focus groups with nurses ($n=12$) including nurses, nurse managers and nurse care technicians. Other health professionals and support personnel	Decentralised nurse stations reduced nurse-to-nurse interactions and teamwork whilst heightening nurse interdependencies and teamwork with other health care occupations. Many nursing-related processes remained centralised whilst nurse stations were decentralised, creating systems-based problems for nursing care. Nursing communities of practices were adversely affected by the new design. Nurse station design shapes communication, patient care processes, and patient outcomes
Rosen et al. (2017)	Sweden Oncology wards in a new hospital building with all single-bed rooms	To explore nurses' descriptions of patient focused care (PFC) during observed situations	Qualitative study with a descriptive design. Non-participant observation and interviews	Registered nurses ($n=4$)	Three categories were identified: (i) barriers to being close to the patient, (ii) desire to be close to the patient and (iii) the influence of environment on caring. Nurses expressed a desire to work closely with patients but the observations of PFC showed that the reality was different
Trzpuc and Martin (2010)	USA Urban hospital in the midwest	To determine how the design of urban medical-surgical nursing units influences nurses' communication and perceived social support	Exploratory, mixed-methods study. Analysis of floor plans of urban medical-surgical units and semi-structured interviews	Registered nurses ($n=2$) and one health unit coordinator	The use of space syntax theory for analysing medical-surgical nursing unit floor plans is complex. Nurses' perceptions of two constructs of space syntax theory, visibility and accessibility, did not consistently match the anticipated benefits of the floor plan designs

sometimes if they haven't got that much family coming to see them they keep you for a little bit longer…' (Donetto et al., 2017, p. 126).

1.8.3 | Safety

Eight studies described nurses' concerns about safety aspects of single rooms (Bloomer et al., 2016; Chaudhury et al., 2006; Cusack et al., 2019; Deitrick et al., 2010; Donetto et al., 2017; Maben et al., 2016; Raj et al., 2022; Real et al., 2017). Whilst single rooms were thought to keep the nurse closer to one patient (Real et al., 2017) and result in '100% focus on one patient is better than one eye on one patient, another eye on another patient' (Chaudhury et al., 2006, p. 127), concern was raised over loss of the ability to see patients (Chaudhury et al., 2006; Donetto et al., 2017; Maben et al., 2016; Raj et al., 2022; Real et al., 2017), and be seen by patients, which was considered paramount (Cusack et al., 2019). Decreased surveillance and impediments to nurses' ability to monitor and 'eyeball' several patients at a glance (Donetto et al., 2017) was attributed to in-board placement of the ensuites in single rooms adjacent to the corridor (Donetto et al., 2017; Maben et al., 2016), walls enclosing each single room (Donetto et al., 2017) and a tendency to close doors (Real et al., 2017). In comparing to multiple occupancy rooms in a previous ward, one nurse shared:

> Working in the open plan areas with the six beds can be fabulous…you can do a very quick scan and prioritise your time based on that initial assessment. Who's well? Who's safe? Who looks a bit different? Who is waving at you madly or not breathing? So that really instant assessment can help at times.
>
> Nurse interviews ID 01 (Cusack et al., 2019, p. 967).

Safety concerns were described as a prominent source of anxiety (Donetto et al., 2017), which nurses attempted to overcome:

> You have to adjust your nursing practice just to make sure that everybody is seen and you keep an eye on them the whole time…you have to physically go in to each and everybody's room, or stop and have a look at them.
>
> M03 nurse, medical assessment unit (Maben et al., 2016, p. 249).

> I walk around with my head permanently fixed to the side that all the rooms are on, just checking… I've just adapted. I now look into every single room every time I walk past and I make the effort to go into the rooms.
>
> M05 junior sister, medical assessment unit (Maben et al., 2016, p. 249).

The increased risk of critical incidents such as when an unobserved patient rapidly deteriorates or falls was also attributed to single rooms (Bloomer et al., 2016; Cusack et al., 2019; Donetto et al., 2017). Compared to multiple occupancy room designs where there was '…the sense that there's a nurse just around the corner' (Bloomer et al., 2016, p. 2208), in single rooms, other measures were used to ensure patient safety. For example, in an ethnographic study conducted in medical surgical wards in the ICU, patients who were deemed a high falls risk were regularly observed sitting outside the room, in the long dark corridor, so staff could 'keep an eye' on them (Donetto et al., 2017). Importantly, nurses in several studies acknowledged not being able to always prevent patients falling (Donetto et al., 2017; Maben et al., 2016; Real et al., 2017). Even if a patient's nurse could be 30-feet away outside another patient's room, a nurse may not be able to anticipate a fall (Real et al., 2017), as one nurse shared:

> Last week, we had about three people […] climbing out of beds and falling […] And I know on an open ward [patients] can still climb out of bed but at least as you're walking up and down the ward you could physically see them […] now the only time we know somebody has fallen out is when we hear the clump and they're on the floor.
>
> Nurse, surgical ward (Maben et al., 2016, p. 249).

Situational awareness: A heightened lack of situational awareness was also a safety concern attributed to single rooms. A lack of awareness of their surroundings was suggested as a potential source of anxiety for patients (Bloomer et al., 2016). In a UK study, nurses reported that single rooms also meant patients seemed to be less aware of how busy staff were on the ward, and unable to see or hear care happening: '…people think because they haven't seen you you're not working' (Donetto et al., 2017, p. 127). The gravity of this was amplified when the nurse was attempting to care for a sick or deteriorating patient:

> if you've got a very poorly patient going on, taking one to two of your nurses up, you've still got relatives coming in, wanting to speak to doctors, and they don't see that, they don't see that busy bit, because it's in a room shut away.
>
> Adult assessment unit, post-move (Donetto et al., 2017, p. 7).

A lack of situational awareness was an issue for nurses too. Nurses described seeing less of their colleagues, being unaware of what was happening in other parts of the ward (Maben et al., 2016) and not knowing when other staff may need help (Cusack et al., 2019). When nursing stations were decentralised and placed in closer proximity to patient rooms, as described in three studies, nurses felt that not only was it much harder to find help when needed, but the distance between nurses resulted in a sense of isolation among nurses on any given shift (Maben et al., 2016; Real et al., 2017; Trzpuc & Martin, 2010). As one nurse put it: 'I always felt isolated, always because the halls were so long. And you would hardly see the other nurses from the other side or the other end' (Trzpuc & Martin, 2010, p. 51).

1.8.4 | Communication and collaboration

In 10 studies, the impact of single rooms on nurses' communication and collaboration was also identified (Berry & Parish, 2008; Bloomer et al., 2016; Cusack et al., 2019; Deitrick et al., 2010; Donetto et al., 2017; Kelly et al., 2022; Maben et al., 2016; Raj et al., 2022; Real et al., 2017; Trzpuc & Martin, 2010). A comparison before and after a move from multiple occupancy to single rooms, of supervisor support, communication openness and teamwork, revealed no significant differences in the three measures (Berry & Parish, 2008). Yet in other studies, nurses reported their colleagues were less visible, and there was less mutual support (Maben et al., 2016), opportunities for solidarity (Kelly et al., 2022) and collaboration were lost (Kelly et al., 2022; Maben et al., 2016). One study identified a lack of transparency in workload (Bloomer et al., 2016). Nurses also experienced challenges with team communication (Donetto et al., 2017; Maben et al., 2016; Raj et al., 2022), an ongoing problem that one nurse manager suggested needed to be addressed:

> It's a huge challenge … I've really tried to promote having the small little huddles at a couple of times during their 12-hour shift just to find out what's going on on the unit and to touch base with each other. And they don't do it. Not like I would like for them to. They say they just don't have time. But I mean, something could be going on, something bad could be happening on one side of the unit and no one would know. Unless the code light goes off or somebody starts screaming. They have lost that sense of what's going on in the whole unit.
>
> Mary, manager (Real et al., 2017, p. 1564).

Opportunities for vicarious learning (Raj et al., 2022) and to collaborate and participate in informal mentorship were also impacted by single-room ward designs (Donetto et al., 2017; Maben et al., 2016). When nurses worked independently from each other in their separate areas, the opportunity to listen to more experienced colleagues at work, picking up things from each other and role modelling of good practice (Donetto et al., 2017) was minimised. In reflecting on their experience in a multiple occupancy ward, one nurse explained:

> You overhear someone working behind a curtain and you pick up and you think, 'That was a really nice thing they did for that patient. Maybe I'll try that.' I think that's definitely missing, picking up on things from each other that way, because […] it's not as easy to hear how they interact with people.
>
> Junior sister, medical assessment unit (Maben et al., 2016, p. 250).

In two studies, the use of call bell consoles, staff telephones and hand-held communication devices were used to counter some of the emergent issues with communication and collaboration (Deitrick et al., 2010; Trzpuc & Martin, 2010). In Deitrick et al's (2010) ethnographic study, staff were observed using the call bell console at the nurses' station to see which room light was on when they heard a call bell, then using their telephones to call each other for help. These findings suggest telephones supported nurse-to-nurse communication and collaboration. However, the use of hand-held communication devices was not always appropriate and 'it's better to communicate in person, or if there is a privacy issue and you can't be standing in the hall talking about a patient or a problem' (Trzpuc & Martin, 2010, p. 51).

2 | DISCUSSION

This integrative review was undertaken to evaluate current evidence regarding work environmental issues for nurses in hospital wards with single rooms. Nurses perceived that single rooms provide patients with increased comfort, space, privacy and confidentiality. However, they are concerned about impaired peripheral awareness and patient safety issues, reduced social interaction for patients, increased walking distances, and interference with teamwork and collaboration. These findings need to be considered when planning hospital re-design.

This review confirms previous understandings regarding patients' preferences for single-room accommodation (Taylor et al., 2018). Nurses acknowledge that increased privacy afforded by single-room accommodation provides a more suitable environment for patients to interact with their families and to have private and/or sensitive conversations with healthcare professional staff. In a systematic review, Taylor et al. (2018) identified that communication benefits are related to improved confidentiality, reduced roommate interruptions and ease for difficult serious conversations. However, nurses recognise that there is an inherent trade-off between privacy in single rooms and companionship in shared accommodation. Single rooms may also be more suitable for specific patient conditions (e.g. delirium, end of life and infection). There is a paucity of evidence that has determined patients' preference for privacy in contrast to opportunities for social interaction (Taylor et al., 2018). Overall, however, evidence suggests that communication and confidentiality are improved in single rooms (Taylor et al., 2018).

Despite the predominant view by nurses that patients prefer single rooms, our review has identified that after experiencing nursing practice in this environment, nurses have less favourable views. The prominent concerns identified in this integrative review about single-room layout relate to nurses' perceptions of the increased risk of patient falls and inability to detect patient deterioration due to impaired visibility. Walls and closed doors restrict nurses' capacity to see and hear patients and may result in delayed nursing care. Adverse patient outcomes were associated with delays in responding to patient deterioration and failure to identify the patient at risk of falling (Burke et al., 2020). Moreover, missed nursing care was found to affect nurses' workplace satisfaction and was associated with intention to leave and nursing turnover (Tschannen et al., 2010). Prior to the COVID-19

pandemic, the global nursing shortage was a well-recognised issue, with an estimated shortfall of 5.9 million nurses (World Health Organization, 2020). It is therefore critical for organisations to identify causes of workplace stress, such as stress related to missed nursing care, to mitigate further risk of increased turnover among nurses.

Despite nurses' concerns about the potential for increased risk of falling, there is inconclusive evidence that single rooms increase or decrease risk of falling (Taylor et al., 2018). More research is needed to examine the system effect of room configuration on patient falls. In the meantime, tailored strategies need to be considered to address patient safety concerns in single-room configurations.

The impact of single rooms on nurses' work, communication and collaboration was identified as a major concern by nurses in this review. The increased walking distance in single-room settings impact on nurses' work practice is well established in literature outside this review (Ulrich et al., 2008). A scoping review found that increased walking distance significantly affect work-demands, and in some cases, affect nurses' ability to respond in a timely way (Søndergaard et al., 2021). Nurses reported the confinement inside individual patients' rooms gave little or no chance of seeing or hearing a colleague in need of help or of reaching out for help for themselves (Ulrich., 2006), which made them feel isolated. These issues clearly indicate the importance of developing strategies that maintain mentorship and teamwork in single-room settings. Design of workspaces should consider innovative flexible spaces for informal exchanges that are adaptable for variable needs and support fast, effective team communication for staff to feel safe and in control (Naccarella et al., 2019). Nursing leadership is needed to develop strategies to minimise walking distance, support collegiality and teamwork and minimise sense of working in isolation.

Communication is a foundation of effective interprofessional collaborative practice (Rashotte et al., 2016) and a cornerstone of high-quality, safe patient care. In single-room settings, nurses experience stress in relation to patient safety, as they encounter barriers to using all of their senses, limiting their capacity to scan a multibed ward whilst performing their duties (Maben et al., 2015; Søndergaard et al., 2021). Numerous studies have identified safety and quality concerns in single rooms, particularly in regard to falls (Søndergaard et al., 2021). In single-room configurations, nurses are required to adapt their working practice, for example hourly rounding, to ensure all patients are seen regularly, and to contribute to teamwork (Maben et al., 2015). Simon et al. (2016) found there was an increase in adverse safety events when changing from multibed settings to single rooms. This demonstrates the importance of implementing strategies to provide safe care that specifically accommodate nurses' workflow when working in single rooms (Maben et al., 2015). After changing to single-room configuration, Maben et al. found that trial and error and individual solutions were a feature of innovations with staff trying to identify ways of preventing falls and decentralising teamwork (Maben et al., 2015). Therefore, a strategic safety and quality framework needs to underpin the planning of nursing workflow when single rooms are introduced.

2.1 | Strengths

To our knowledge, this is the first review that has attempted to summarise available evidence regarding work environmental issues for hospital nursing staff employed in single rooms. The methods applied to undertake this integrative review are detailed and transparent. At least two authors independently screened the identified papers for eligibility and agreement regarding study inclusion was reached by the team. We are confident that the search strategy identified all relevant papers utilising a broad range of sources and robust key terms and phrases.

2.2 | Limitations

Although we comprehensively searched four databases to identify studies that evaluated work environmental issues for hospital nursing staff employed in wards with single rooms, we only included studies available in English. Thus, papers published in other languages may not have been identified and included in this review. The small number of included studies is a limitation of this integrative review. None of the included papers included randomised experimental designs; hence, limited causal evidence exists to build strategies to enhance nurses' working practice in single-room environments. The methodological weaknesses of some studies, such as very small sample sizes, limits the generalisability of the research findings. All studies were included regardless of quality assessment. Also, some studies included non-nurse participant data. Papers were only included if we could clearly identify nursing data. For example, exemplar quotes were only included from qualitative studies if we could clearly identify that a nurse was interviewed. Also, there was a lack of homogeneity with a range of methods (survey, focus groups, ethnographic observations), which precluded capacity to undertake a meta-analysis.

3 | CONCLUSION

This review describes how single rooms affect nurses' work experiences. We illustrate that whilst nurses perceive that patients prefer single rooms, they had concerns that social interaction opportunities may be limited. Nurses who have practiced in single rooms worry about delayed responses to care and failure to identify patients at risk of deterioration and falling. In their view, wards configured with single rooms restrict nurses' visibility of patients and patients' visibility of nurses. We can also conclude that limited visibility in single-room settings affected team communication and opportunities for collaboration.

However, our study also illustrates that there is lack of robust studies evaluating the effect of single rooms on patient safety outcomes including falls and patient deterioration. More opportunities for early consultation or to co-design of work environments might prevent or minimise nurses' dissatisfaction with new single-room ward layouts.

3.1 | Relevance to clinical practice

Single rooms were viewed positively in terms of overall comfort and privacy for patients and confidential communication. Although nurses are key to the provision of safe and high-quality care, there is little evidence that they are consulted early in the process of designing new hospital wards. Early consultation with nurses is integral to ensure workflow accommodates safe nursing practice. Findings from this review highlight the need for further work in this area, especially around strategies for careful planning to maintain and strengthen teamwork, prevent nurses' sense of working in isolation, as well as creating opportunities for mentorship, feedback and collaboration among nurses when working in wards with single rooms.

AUTHOR CONTRIBUTIONS

Study initiators were SFS, DK, BRa, KF, BRe, RK and MJB. The searches were performed by HSL. SFS, DK, BRa, KF, BRe, MT, RK and MJB participated in study selection and quality assessment. Extraction was performed by BRe and BRa. The initial analysis was performed by MJB and checked by BRa, followed up with a discussion of the findings in the research group. SFS, DK, BRa, KF and MJB drafted the manuscript. All authors contributed constructively during the preparation of the manuscript. All authors have read and approved the final manuscript.

FUNDING INFORMATION

The research was funded by Central Region Denmark and VIA University College, the Research Centre for Health and Welfare Technology Denmark.

CONFLICT OF INTEREST STATEMENT

The authors declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

DATA AVAILABILITY STATEMENT

The analysis that supports the findings of this study is available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Søndergaard, S. F., Rasmussen, B., Kerr, D., Frederiksen, K., Redley, B., Trueman, M., Kolbaek, R., Laursen, H. S., & Bloomer, M. J. (2023). Nurses' work experiences in hospital wards with single rooms: An integrative review. *Journal of Clinical Nursing*, *00*, 1–14. https://doi.org/10.1111/jocn.16824