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Research paper

Facilitating the relocation of an intensive care unit from shared room to single room setting: Staff perceptions on the effectiveness of a multicomponent intervention

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ABSTRACT

Background: Current strategies for new and redesigned intensive care units (ICUs) involve incorporation of single occupancy rooms. These changes have largely been made for infection control and patient privacy reasons. However, there is limited literature available on how to manage the transition of an ICU from shared room to a single room environment.
Aims: The aim of this study was to evaluate staff members' perceived effectiveness of a multicomponent intervention to facilitate transition from a shared to a single room setting.
Methods: This qualitative study was conducted in a 20-bed ICU of an Australian tertiary teaching hospital. In total, 24 staff members were interviewed in five groups and five individual interviews 6 months after the ICU relocation.
Findings: Three themes emerged from data analysis: (1) facilitating staff members' transition and engagement during relocation planning; (2) simulating new work processes for the single room setting; and (3) supporting nurses working in the single rooms. The components of the intervention, including the change agent, the relocation working party, Assistance, Coordination, Contingency, Education, Supervision, and Support nurse rounding model, and the safe single room model, were perceived as important strategies to support the relocation transition. The regular newsletter and the information dissemination strategy informed by the social networking survey were viewed to improve communication. Staffing levels and education models that are suitable for the single room setting were identified as areas for improvement.
Discussion and Conclusion: A systematic change management approach, clear communication, staff engagement, and continuously monitoring new work processes are important strategies to ensure the success of the relocation. Delivery of education in the clinical area needs to be further explored to ascertain the impact of a single room environment on its delivery. Intervention co-creation involving research team members and the clinical staff was important in building change management capacity, which may contribute to intervention sustainability and continued clinical practice improvement.

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1. Introduction

The first intensive care unit (ICU) was established in 1953 in Europe, but it was not until the 1970s that the majority of ICUs were built around the world.[1] A multi-occupancy design with a large, open, shared room, and multiple beds was the prominent design for ICUs because it was thought to promote teamwork and increase patient visibility and supervision.

Contemporary ICU designs incorporate single-bed rooms to improve privacy and create a better environment for patients and their families.[2] Although debated, the single room environment is also believed to minimise hospital-acquired infections.[2,3] Incorporation of a single room environment may occur when the original physical space of the ICU is reconfigured or when an ICU is newly constructed. For new, rather than redesigned, ICUs, there is the added need to manage both ICU redesign and relocation. These two concurrent changes in the work environment can be challenging because environmental and work process changes are required alongside potential changes in patient acuity, case mix, and staffing profiles. To date, there is little known about how to effectively facilitate the transitions associated with ICU relocation and reconfiguration from a multi-occupancy ICU design to one which where patients are all located in single rooms.

2. Aim

The aim of this study was to evaluate staff members' perceptions of the effectiveness of a multicomponent intervention designed to support the relocation of an ICU from a multi-occupancy to a single-occupancy environment. This study forms part of a larger three-phase project (assessment of situation and developing a relocation intervention, implementation, and evaluation) where the aim was to facilitate the transition to a single room environment within a newly constructed hospital. Phase 1 and 2 findings are reported elsewhere.[4,5] In this article, the findings from phase 3, the evaluation phase of this study, are reported.

3. Method

This qualitative evaluation study used ethnographic data collection techniques including focus group and individual interviews. The evaluation occurred 6 months following the ICU relocation.

3.1. The study context

The larger interventional study was conducted from 2013 to 2016. In phase 1 of the larger study, factors to be considered when managing relocation were identified including using a systematic change management strategy, focusing on change management leadership and expertise, effective management of staff psychological stress, and enacting an effective communication strategy. Work processes and a model of care that are suited to the new single room environment should be also developed.[4]

In phase 2 of the study, researchers and clinicians working in the unit co-created and implemented a multicomponent intervention which was informed by phase 1 findings and underpinned by Bridge's transitions theory[6] and the theory of expansive learning.[7–9] Development of the intervention has been published elsewhere.[4] Briefly, the intervention components included a change champion, a dedicated single room work process working party, a communication strategy, the Assistance, Coordination, Contingency, Education, Supervision, and Support (ACCESS) nurse rounding model, and the safe single rooms model. The ACCESS nurse rounding model and the safe single room model, which focused on supporting bedside nurses working in the single rooms, were developed and simulated before the move, then implemented after the move. Table 1 shows intervention components, the activities, and processes associated with each components.

3.2. Setting

This study was conducted in an adult ICU of an Australian tertiary teaching hospital which was relocated to a newly constructed hospital in southeast Queensland in late September 2013. The previous ICU was a 14-bed unit with most beds in an open, shared space. The newly built 50-bed ICU was configured as five pods of 10 single-bed rooms although at the time of opening only 20 beds had operational funding. The relocation also resulted in an expansion of services to include cardiothoracic surgery and paediatric critical care, and an increased number of new staff were recruited for the new ICU. There was no change to the staffing level guidelines used in the ICU before and after the move, with a nurse:patient ratio of 1:1 for ventilated patients; one ACCESS nurse was allocated for every four ventilated patients in line with the Australian national standards.[10]

3.3. Sample

All medical and nursing staff working in the ICU at time of evaluation were invited to participate in the study by expressing interest to the research assistant.

3.4. Data collection

Six months after relocation, we conducted focus groups and individual interviews to evaluate intervention effectiveness. The focus groups were conducted on the days when at least four staff who expressed interest to participate were at work. Individual interviews were conducted with staff in senior management roles to avoid unequal relationships in the focus groups and with staff who were working on the days where there was less than four people to form a focus group. The first author of this paper, who is an experienced critical care clinician/university academic and does not have direct working relationship with the participants, conducted the focus groups and individual interviews. A research assistant was the focus group observer. Interview questions were semi-structured with questions aligned to the components of the intervention. For example, we asked, “what impact did the pre-move simulations have on your experience transitioning to a single room environment?” All focus groups and interviews were audio-recorded and transcribed verbatim. Participants completed a non-identifiable demographic data sheet. To avoid focus group bias, we recruited as many participants as possible, conducted multiple focus groups, and the focus group questions were reviewed by all authors to ensure there was no expected answers.

3.5. Data analysis

Preliminary data analysis commenced during data collection to ensure data reached saturation before data collection was ceased. The transcripts were entered into NVIVO, version 10 (QSR International, Melbourne, Australia), and inductive thematic analysis was conducted. Transcripts were read line by line a number of times by the first author. Categorical codes were generated according to contents. The initial codes were reviewed a number of times to identify themes which were then discussed among all authors, and revisions were made.

Table 1
Intervention, intervention components, and the implementation strategies.

Relocation stage	Intervention components	Target audience	Implementation strategy/processes/timelines
Before the relocation	Introduce a change champion	For bedside nurses: provide better communication regarding relocation For managers: to lead the relocation working party and plan for the relocation	Commenced 6 months prior the relocation, until 6 months after relocation Change champion based in the unit 2 days a week
	Relocation working party: co-creation of the intervention	For the organisation: identifying what work processes that may need change and plan for the change	Commenced 6 months prior the relocation, until 6 months after relocation Held 8 meetings, worked on new work model plans, including the ACCESS* nurse rounding model and the safe single rooms model (emergency procedures, room setup and supply method, etc.)
	Communication strategy	For bedside nurses: to improve communication regarding the relocation plan	Commenced 6 months prior the relocation and continues to date Regular newsletters sent to all staff. Social networking survey conducted to inform information dissemination
	Safe single room model: prerelocation simulation	For bedside nurses: to stimulate forward thinking about the relocation For managers: to stimulate thinking about resources required for the relocation	3 months prior the relocation for two weeks Single room simulation (draw curtain to simulate single rooms)
	ACCESS nurse rounding model: trial and test the model	For bedside nurses: providing support to bedside nurses For the organisation: ensure patient safety	Commenced 3 months prior the relocation, and it is now embedded in normal practice ACCESS nurses provided regular rounding to support bedside nurses using an rounding template
After the relocation	ACCESS nurse rounding model	For bedside nurses: providing support to bedside nurses For the organisation: ensure patient safety	Commenced after the relocation Role clarification of ACCESS nurses
	Safe single rooms model: test, revise, and implement the model	For bedside nurses: providing support to bedside nurses For the organisation: ensure patient safety	3 months after the relocation Post-move issues monitoring (survey and informal interviews to inform the revision of the safe single rooms model) Improve response to bedside nurses' *staff assist**calls Regular rounds by support staff to assist bedside nurses on patient care.

*ACCESS: Assistance, Coordination, Contingency, Education, Supervision, and Support. The ACCESS nurse role was introduced in this hospital in a previous project. These nurses do not have a patient load during their shifts. There was often one ACCESS nurse for every 4–5 ventilated patients in the unit.
*Staff assist: There was a call button in each patient's room which nurses can use to call for assistance with patient care.

4. Ethical considerations

The hospital and university's ethics committees approved this study committee (approval number: HREC/12/QGC/146 and NRS/54/12/HREC). All participants gave written consent.

5. Findings

A total of 19 staff members participated in five focus groups which lasted up to 60 min, and five individual interviews were conducted lasting 20–30 min. Participants included 22 nurses and two medical staff. Among the participants, there was representation of nursing staff from all age groups, employment classifications, and gender. Only two participants (8%) had prior experience in ICU relocation, and eight participants (33%) had experience working in single room ICUs. Table 2 shows the demographic information of the participants.

Thematic analysis of the focus group and individual interviews revealed three themes: *(1) facilitating staff members' transition and engagement during relocation planning; (2) simulating new work processes for the single room setting; and (3)* supporting *nurses working in single rooms.* When reporting results, we use FG to denote focus group, and INT as interview.

5.1. Theme 1: Facilitating staff members' transition and engagement during relocation planning

This theme describes participants' transition from feeling anxious and "fearful" about the change to taking a solution-focused approach which involved active engagement with the relocation planning, and how the necessary structures supported the transition process. Participants stated that attending focus groups in phase 1 of the study gave them the opportunity "to discuss my concerns about the relocation in a group, which helped to relieve my anxiety, and made me feel that I was not alone" (FG 2), and "made me to think about the relocation … forced me to face my fears about moving to an isolating environment [single room ICU]" (INT23). In addition, participants stated that participating in the focus groups during the evaluation phase, 6 months after relocation, gave them the opportunity to talk

Table 2
Participant demographic information (N = 24).

Characteristic	N	%
Gender		
Female	15	63
Male	9	37
Age (years)		
20–29	4	17
30–39	5	21
40–49	7	29
50–59	8	33
Employment classification[a]		
Grade 5 RN	12	50
Grade 6 RN	4	17
Grade 7 RN	6	25
Medical consultant	2	8
Prior work experience[b]		
Paediatric ICU	2	8
Cardiothoracic ICU	11	46
Single room ICU	8	33
Relocation of hospital including ICU	2	8
Relocation of hospital but not ICU	3	13

ICU, intensive care unit.
[a] Grade 5 RN: bedside registered nurses; Grade 6 RN: registered nurses who are often in charge of the shift; Grade 7 RN: registered nurses in management roles including nurse unit managers, clinical nurse consultants, or educators; consultant: intensive care medical specialists.
[b] Staff prior experiences: some staff had answered "yes" to more than 1 category; thus, the total of this section is more than 100%.

about post-move experiences and issues as a group. Some ACCESS nurses commented that "as an ACCESS nurse hearing about how everyone has been feeling about the support they received was important to me" (INT21).

Having the opportunity to engage with the relocation planning, including being part of the relocation working party, attending planning meetings, and contributing to the newsletters was perceived as important contributors for the success of the relocation. A number of participants' comments were similar to what this participant said: "… compared with other clinical areas of the hospital … a lot of wins we had during the relocation transition were attributed to the research project" (INT22) and "going through the research process stimulated my own thoughts. It was helpful for me to think about my own work and how I would made future changes" (INT24).

Strategies that were put in place during this project including the change champion, communication strategy, and the relocation working party were perceived as crucial during the transition period. Participants unanimously agreed that having the change champion based in the ICU helped with communication because "it was the only place that we could find answers and information about the relocation" (FG2). In addition, staff commented that "the research group [working party] was acting as a link between staff and management to address the concerns which was important … made me feel that my voice was being heard" (INT24).

Most participants stated that the newsletter dissemination strategy worked, and "the newsletter was the only place we could find factual information about the relocation. Before that we keep [sic] hearing a lot of rumours which were untrue" (FG3). It was also suggested the newsletter was a way to ensure nurses stay connected in the single room environment, as "one issue with the single room is that you are stuck in there and don't know who else is on the shift apart from the limited few you see at meal breaks" (FG1).

5.2. Theme 2: Simulating new work processes for the single room setting

This theme illustrates participants' perceptions of the effectiveness of the pre-move simulations. These pre-move simulations included drawing curtains as a strategy to simulate the single room environment, the ACCESS nurse rounding simulation, and clarification of the multidisciplinary team members' roles and responsibilities while we looked at how to support bedside nurses during the simulation.

Some participants perceived the single room simulation as "poorly designed and not supported by nursing management and senior staff". In contrast, others thought the pre-move simulation "raised awareness of what [working in] single room would be like, and the experience after the move was not a complete shock" (INT22). In addition, some participants reflected that after the single room simulation, staff members started actively seeking information and asking questions about the planning for single room processes instead of waiting for information to be fed back to them.

The pre-move ACCESS nurse single room rounding model was considered helpful for staff to gain insight into what support they may get when working in single rooms, and how to provide support to others. It was agreeable among the ACCESS nurses that ACCESS nurse rounding model simulation "helped me as an ACCESS nurse to plan my shift and how best I can help others before and after the move" (FG5).

5.3. Theme 3: Supporting nurses working in single rooms

This theme summarises bedside nurses' experiences and perceptions on the support they received after move. Participants stated that the ACCESS nurses and senior management team "were working together closer and communicating more than before to support the bedside nurses," and "people are learning to be flexible and making an effort to make the system work although many issues remain to be resolved" (INT22-24).

There was concern that the incidental learning that occurred as nurses learned from each other within a multi-occupancy ICU environment was now lost in a single room environment. It was considered more detrimental for less experienced nurses with the point made that it "makes it difficult for junior staff to develop and learn from others" (FG4). More structured education such as in services which provided face-to-face education away from the bedside were now more difficult to deliver in the new single room environment because " nurses working next to each other can no longer relieve each other so less [sic] people can go to education sessions in any given time" (FG5). It was suggested that innovative ways of education, such as online education must be considered by the education team.

The challenges in providing education to bedside nurses made the ACCESS nurse role even more important than being in a shared room environment, according to the participants. While most participants agreed that they felt supported by ACCESS nurses during their shifts, many participants believed that the ACCESS nurses role and responsibilities evolved after move. Before the relocation, the ACCESS nurses mainly provided knowledge support to bedside nurses. After the move, this role included supervision, routine patient care assistance, conflict resolution, and support. Most participants believed the ACCESS nurse role needed to be further developed in the single room environment. Participants suggested leadership, and conflict resolution training should be provided to ACCESS nurses so that they can more confidently manage complex staff issues at the bedside.

Staffing level and the support bedside nurses received were mentioned often by participants. This staffing level, unchanged from the pre-move level, was perceived to potentially influence safe practice. In the previous multi-occupancy ICU, one nurse was able to watch two ventilated patients during meal breaks because of the close proximity. In the single room setting, however, there is less flexibility for staffing during meal times as nurses caring for ventilated patients had to be relieved by another nurse to maintain the 1:1 nurse to patient ratio. Consequently, according to majority of the participants, "the nurses who were caring for non-ventilated, but critical, patients were often asked to assist the nurses with ventilated patients. This left the non-ventilated patients who could not call for help if needed "at potential risk" (FG4, INT24). The staffing level was also considered as an issue for staff wellbeing as ACCESS nurses often had to shorten their meal breaks so they were available to relieve or assist others; at times they missed a meal break altogether. This issue was described as being more problematic on night duty when there were fewer management and support staff on duty who could help with meal breaks.

Regardless of the staffing issues, nurses felt optimistic about the transitional period after the move. The post-move survey and informal short interviews which were conducted during the 3 months after the move gave staff confidence that "someone is monitoring what we are going through and patient safety is being considered by experts". Staff commented that they were "relieved to see changes were made based on our response in the post-move survey and interviews" (FG4).

6. Discussion

Hospital relocations are considered one of the most complex change management projects, and relocating an ICU is even more so because of the high patient acuity. This study demonstrated that

a planned systematic approach, establishing dedicated change management structures, clear processes on managing the transition and plan for the new work environment, and monitoring the effectiveness of change management strategies contributed to a smoother transition.

6.1. Supporting and engaging staff and building change management capacity

Staff members' psychological wellbeing during hospital relocation should be one of the key priorities in change management. A change of hospital environment from a shared room to a single room setting can contribute to increased staff stress months after the relocation.[11] Engaging staff in the transition management and preparing staff for the new environment are important for the staff members' psychological transition,[4] strategies which are highlighted by change management theories such as Lewin's change model[12] and Kotter's eight-step change management model.[13]

Engaging staff co-creating the intervention was considered an effective approach. The research team and the clinicians co-created the intervention and implementation strategies, including establishing the necessary structures and processes. Working alongside each other, the research team and the clinicians followed a systematic process in developing, testing, revising, and implementing the interventions and strategies (citation masked for blinded review). As recommended, involving staff in change management process has a number of advantages including promoting organisational learning, building capacity in change management, relieving staff emotional stress and anxiety in the new environment knowing ongoing work is in progress monitoring change, and sustaining optimal practice.[14,15] Partnering with clinicians closely throughout the whole study process ensured the changes were meaningful and interventions appropriate, and this approach aligned with recommendations for sustaining a new practice.[9,16] In addition, the co-creation approach appeared to be helpful in building capacity as some participants stated that they would use what they learned in this project in future change management.

6.2. Safe single rooms—supporting nurses at the bedside

The change of physical working environment from an open multi-occupancy space to single occupancy patient rooms significantly decreased bedside nurses' interactions with others, which then had potential to change the support bedside nurses received, particular for the provision of education. While we could not locate any literature on the support ICU nurses receiving when working in single rooms, Maben et al.[15] found that nurses working on hospital wards perceived locating other staff during their shift was difficult and an all single room setting posed a challenge for teamwork.

Role clarification of ACCESS nurses in this study was seen as important with emphasis that the ACCESS nurses needed to be more aware of their responsibility in providing education and support to bedside nurses, especially junior nurses. This is consistent with the suggestion that although the nature of hospital nurses' work did not change in the single room setting, nurses need to adjust their work patterns in the different work environment to make it work.[17]

Similarly, the delivery of clinical education within a single room environment required some reconfiguration. The perception that incidental learning was compromised because nurses could no longer see, hear, and speak with each other was a significant concern for nurses. Incidental learning is described in the literature as a social learning that occurs in a person's everyday practice during interaction with others in an unplanned and opportunistic fashion.[18] Incidental learning is considered an important learning method in professional practice because it occurs in real-life situations.[19] In this single room setting, interactions among nurses were reduced due to physical barriers, which consequently reduced opportunities for incidental learning. Workplace learning literature (learning that occurs at individual or organisational level) suggests that individuals are social beings who learn “on the job” through interactions with others.[20] Opportunities for independent informal learning in healthcare organisations have been found to be associated with improved workplace outcomes.[20] In addition, face-to-face education, often considered as a form of formal workplace learning,[21] became more difficult in the single room setting because fewer staff could be off the floor at any given time. Thus, innovative ways to conduct staff education should be explored and staff learning environment (formal and informal learning) may need to be redesigned, such as incorporating bedside nurses' education into the ACCESS nurses role.

6.3. Improving communication

Communication is considered one of the crucial elements in change management.[12,13,22] Clear communication ensures transparency in change management which can consequently reduce uncertainty and staff anxiety. In this evaluative study, we found that the structures which were put in place as a result of this project acted as important communication conduits between bedside staff and management. The information dissemination strategies were perceived to be effective in keeping staff informed. In addition, the process of data collection which included focus groups were also described as being helpful because they provided an avenue for staff to communicate with each other about what they were experiencing and get up to date information about the relocation. Current literature suggest that staff would be more likely to engage in change process if they felt informed of the relocation information and were involved in decision-making process.[23] It has been suggested that for a successful change, communication strategy needs to be (i) put in place at the start of the planning phase, (ii) multi-pronged, and (iii) consistent throughout the project.[23]

7. Limitation

There were a number of limitations to this study. First, this study was conducted in a single site, and thus the findings are not necessarily transferrable to other clinical contexts. However, the principles and the learnings we gained in managing this transition project may be used to inform other change management projects. Second, while we attempted to get input from a broad range of health professionals, there was a limited contribution from the medical staff. Staffing rotations resulted in a change in medical staff present before the move were no longer working in the ICU at the time of the evaluation. A result of the changes to medical staffing in this ICU may have resulted in additional factors relevant to this evaluation remaining unknown. Third, quantitative measures of staff and patient satisfaction were not included in the evaluation and should be considered for inclusion in future evaluations. Finally, capture activities the ICU staff participated in as part of the hospital-wide initiatives during the relocation were difficult to track and may have further informed study results.

8. Conclusion

To date, there is limited literature available on how to effectively manage intensive care relocation from a multi-occupancy to a single occupancy setting with little known about impact of single rooms on staffing, patient safety, and the delivery of education in the intensive care environment. As ICU design has changed and the single room design becoming more prominent, further research is

needed to address this important area of practice. The relocation intervention was perceived to be effective during this relocation management project. Bedside staff thought the project provided opportunity for them to communicate their concerns with others. Staff in management positions felt supported by the project team and learned how to manage change which may be beneficial for their future work. However, ongoing developmental work is needed to ensure patient safety and staff support in the single rooms. The ACCESS nurse role needs to be continuously developed, and education model need to be redesigned to suit the single room design, and communication strategies among nurses need to be further explored. Maintaining change is often considered as an important step, which can take time and effort.

Author contribution

All authors listed have contributed to the conception and design of the study, acquisition of data, analysis and interpretation of data; drafting the article, revising it critically for important intellectual content; and final approval of the version to be submitted. All those entitled to authorship are listed as authors.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.aucc.2018.06.008.

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