

The impact of special care nursery design on neonatal nurses

Author

Hogan, C, Jones, L, Saul, J

Published

2016

Journal Title

Journal of Neonatal Nursing

Version

Accepted Manuscript (AM)

DOI

[10.1016/j.jnn.2015.09.001](https://doi.org/10.1016/j.jnn.2015.09.001)

Rights statement

© 2016 Neonatal Nursing Association. Published by Elsevier Ltd. Licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (<http://creativecommons.org/licenses/by-nc-nd/4.0/>) which permits unrestricted, non-commercial use, distribution and reproduction in any medium, providing that the work is properly cited.

Downloaded from

<http://hdl.handle.net/10072/101932>

Griffith Research Online

<https://research-repository.griffith.edu.au>

The Impact of Special Care Nursery Design on Neonatal Nurses

Christy Hogan, BPsychHons, PhD Candidate^a

Liz Jones, BAHons, PhD, Associate Professor^{a*}

Julie Saul, MClin Psych, Psychologist^a

^aSchool of Applied Psychology ,Griffith University

*Corresponding author. School of Applied Psychology, Griffith University, 176

Messines Ridge Rd, Mt Gravatt, QLD 4122 Australia. Tel.: +61 7 37353365

E-mail address: l.jones@griffith.edu.au

Acknowledgements: We acknowledge the support provided Nicola Sheeran, Rachelle Jones, Timothy Hong, Anne-Marie Feary and Sara Woodhouse, and funding provided by Griffith University

Impact of Special Care Nursery Design on Neonatal Nurses

ABSTRACT

The current study examined the impact of neonatal nursery design on nursing staff in an XXX context. Nurses' employee adjustment and job demands and resources were examined, using surveys and interviews, before and after the transition from an open-bay to a single family room (SFR) design. Results revealed significant increases in the level of nurse workload and isolation. Most employee adjustment and resources indicators remained relatively unchanged after the transition, however inconsistencies were found between survey and interview findings. Personal accomplishment improved in the SFR, and nurses reported increased satisfaction from the benefits accruing to infants and parents in SFR, which we argue potentially ameliorate the impact of increased workload and isolation within the SFR.

KEYWORDS

Single family room, nurse wellbeing, neonatal nursery

INTRODUCTION

Historically, Neonatal Intensive Care Units (NICUs) and Special Care Nurseries (SCNs) were constructed as *Open-bay* (OB) wards, where infants were cared for in one or more large rooms (Cone et al., 2010), allowing for direct observation from nursing staff. While the OB ward is still most common, there is a trend toward single rooms for each patient, changing the working conditions of nurses (Stichler, 2012). Research to date has found *Single-family-rooms* (SFRs) benefit both parents and infants in neonatal nurseries, providing appropriate sensory stimulation for the infant, improved infection control, decreased length of stay, enhanced parental privacy and involvement, and increased breastfeeding and skin-to-skin contact (Cone et al., 2010; Harris et al., 2006; White, 2010).

However, little research is available on the effects of different ward designs on staff, particularly nurses, working in neonatal nurseries. Working in neonatal nurseries can be highly stressful, with nurses at higher risk of burnout than other professions (Braithwaite, 2008). Nurses are key care providers in neonatal nurseries, and previous research has found transitioning to a SFR environment impacts nursing staff more than other staff (Stevens et al., 2010; Swanson et al., 2013). In the current study we focus on the effect of the SFR environment on employee adjustment. Employee adjustment encompasses individual employee outcomes, including job satisfaction, organisational commitment, psychological wellbeing and turnover intentions, which collectively are important for an organisation's health (Martin et al., 2005). Research to date examining the impact of SFRs on employee adjustment has been mixed. Job satisfaction has increased in the SFR after a move from an OB (Bosch et al., 2012; Carlson et al., 2006; Shepley et al., 2008; Smith et al., 2009; Stevens et al., 2010), except in one study where staff satisfaction remained stable (Watson et al., 2014). SFRs reduce staff stress (Bosch

et al., 2012; Cone et al., 2010) and fatigue (Bosch et al., 2012) in some studies, but increase stress in others (Domanico et al., 2010) or have no effect on fatigue (Watson et al., 2014). However, many of these studies use single-item, not well validated measures, and a limited range of adjustment indicators. Our key aim is to examine two new indicators (turnover intentions and burnout), using validated measures, that are important for both individuals and organisational performance.

It is well established that job demands (such as workload and conflicting requirements) predict burnout and decreased job satisfaction (Bakker & Demerouti, 2007). Research to date is limited and inconsistent but suggests SFRs may increase demands on staff (Domanico et al., 2010; Shepley et al., 2008; Walsh et al., 2006), although some report no change (Bosch et al., 2012; Cone et al., 2010). At the same time, job resources, such as support and feedback, may temper the exhaustion that demands provoke (Bakker & Demerouti, 2007). Again, there is limited research to date on the effects of SFRs on resources. Smith et al. (2009) found perceptions of supervisor support remained similar over time, whereas Carlson et al. (2006) found peer support to be higher in the SFR. Staff isolation has either not changed between the two designs (Bosch et al., 2012; Cone et al., 2010; Stevens et al., 2010; Swanson et al., 2013), or increased in the SFR (Domanico et al., 2010; Smith et al., 2009; Walsh et al., 2006).

Overall, research suggests SFRs benefit parents and infants, but there is both less research and less consistency in the findings for staff. Moreover, burnout and turnover in nurses in SFRs have not been examined. The current study assessed how the change from an OB to a SFR design influenced nurses' adjustment, including two new indicators, burnout and turnover, as well as their perceptions of job demands (workload) and resources (support).

METHOD

Setting

In 2013 the XXX hospital relocated two kilometres to the XXX hospital (XXXH), where the SCN and NICU changed from an OB to SFRs, enabling this prospective study comparing the impact of the two designs on nurses, while controlling for geographical hospital region. There were no systematic differences between the two hospitals in general procedures and policies, nor the ratio of care (babies to nurses).

OB nursery. The XXX hospital had a level three SCN with capacity for 20 special care infants and two NICU infants. The SCN was made up of two smaller rooms (6x4.5m) caring for four infants, a NICU room and an isolation room both caring for two infants, and a larger area caring for ten infants. The two smaller rooms had a nursing station located next to the opening. All rooms had one wall with a glass window and cardiovascular monitoring was not universal, with infants due to transition home from hospital rarely monitored.

SFR Nursery. The new SFR nursery is a level three nursery with capacity for 28 SCN infants and 16 NICU infants (although only two NICU beds were in use when study conducted). Each SFR in the SCN is 17-19m², enclosed by three floor-to-ceiling walls. The fourth wall is a glass sliding door with a curtain for privacy. Each SFR contains a bed for the infant, medical equipment, infant bath, and a fridge to store expressed breast milk. Cardiovascular monitoring is available on a computer screen within each SFR and at nursing stations and infants are monitored until discharge.

Participants

Nurses and midwives who regularly worked in the SCNs were invited to participate in the study. Recruitment was conducted 12 to 18 months prior to relocation

(OB), and 6 to 10 months post relocation (SFR). Staff turnover and participant attrition resulted in nurses who participated pre-move or post-move only, as well as nurses who participated at both times, thus the data is both cross-sectional and longitudinal.

Procedure

The XXX hospital and the XXX University Human Research Ethics Committees approved this project. Researchers attended in-services to inform staff of the project. Pamphlets were distributed to staff at in-services, on the wards, and in the lunch room. Nurses completed the survey in their own time and could return the survey to researchers directly, post using a pre-paid envelope, or place in a securely locked box in the nursery. Interviews took place in a quiet room, were audio recorded and transcribed. Only interviews from SFR staff are included in the current study, to examine how the change to SFRs had impacted nurses. The semi-structured interviews asked nurses about their experiences of working in an SFR neonatal nursery design, and how their job changed or not.

Measures

Employee Adjustment. Nurses reported turnover intention on two items (for example, “I often think about quitting my job”), using a 7-point Likert scale (1= *Strongly Disagree* to 7= *Strongly Agree*) (Michael, 2012). Participants rated their overall job satisfaction on a 7-point Likert scale (1= *Extremely Dissatisfied* to 7= *Extremely Satisfied*) one-item measure. Burnout was measured using Emotional Exhaustion (feelings of being emotionally overextended and exhausted by one’s work; 9 items) and Personal Accomplishment (feelings of competence and achievement in one’s work; 8 items) from the Maslach Burnout Inventory (MBI) (Maslach et al., 1996).

Nurses responded to items using a 7-point Likert scale (where 0='Never', 3='A few times a month' and 6='Everyday').

Job Demands and Resources. Nurses responded to two items measuring workload from Domanico et al. (2010) using a 6-point Likert scale (1= *Strongly Disagree* to 6= *Strongly Agree*), for example, "I have enough time to do my work". Resources were measured using three items measuring isolation from Domanico et al. (2010), and a 12 item supervisor and peer support scale, based on Michael (2012). Questions were answered on a 6-point Likert scale (1= *Strongly Disagree* to 6= *Strongly Agree*). Isolation items included "Design of nursery makes nurses feel isolated". Supervisor support items included "My supervisor in the newborn care unit listens to what I say". Peer support items were reworded from "supervisor" to "peers".

FINDINGS

Overall, 135 nurses were eligible to participate in the study across both hospitals, with 86 (all female) providing informed consent to participate (OB=40, SFR=46). Fifty-one completed surveys (OB=22, SFR=29), representing a 58% response rate for consented participation in the OB nursery and 63% in the SFR nursery. The two groups did not differ significantly on any demographic variable (see Table 1). As only ten participants completed both the OB and SFR surveys, for analysis the two groups were considered independent samples, a statistically more conservative approach. Eleven nurses also participated in semi-structured interviews within the SFR nursery, however one was excluded due to a recording equipment failure. The nurses interviewed were similar demographically to other survey respondents.

The data was screened for accuracy, missing values, outliers, and normality using SPSS Version 22. The mean score for each subscale was calculated providing more than 40% of items had been completed. Job satisfaction was significantly skewed ($s=-3.06$, $p<.05$). Transformation fixed the skew, but did not change the significance of the results, thus untransformed scores are reported. One outlier was deleted for personal accomplishment, as its removal changed the results. All scales had excellent reliability (see Table 2).

Independent sample t-tests were conducted comparing nurses in the OB and SFR nurseries on perceptions of supervisor support, peer support, workload, perceived isolation, and their adjustment (see Table 2). There were no significant differences for job satisfaction, turnover intention or emotional exhaustion. However, a large variation in scores for emotional exhaustion was found for both nursery designs, and when compared to clinical cut-offs for medical staff, as suggested by Maslach et al. (1996),

emotional exhaustion increased from low (≤ 18) in the OB, to average (19 to 26) in the SFR. Nurses reported significantly higher levels of personal accomplishment in the SFR, increasing from average levels (34 to 39) in the OB to high levels (≥ 40) in the SFR. There was also no significant difference in ratings of supervisor and peer support, however nurses perceived they were significantly more isolated and had a higher workload in the SFR nursery.

Interview findings

To explore why we found increased workload and isolation, yet no differences in job satisfaction and emotional exhaustion and increased personal accomplishment, we reviewed the interview transcripts to identify all references to nurses' adjustment, job demands and support (see exemplar quotes in Table 3).

Regarding employee adjustment, nurses described how SFRs improved their job satisfaction and engagement, through developing better relationships with parents, and improved quality of care, including tailoring of care to the specific family. In addition, satisfaction increased from observing parents being more involved in their infant's care. This was despite some nurses also reporting decreased job satisfaction due to the lack of staff interaction.

Nurses reported increased job demands in the SFR nursery, due to the increased time spent walking and in parent education, as nurses could not educate more than one parent at a time. Nurses commented they were not able to multi-task as easily and it was challenging dividing their time between parents within the nursery. Nurses reported getting caught up in one room, which at times meant they were providing inadequate care. Nurses reported the increased workload reduced staff education, and could, over time, increase burnout. At the same time, some nurses reported decreased job demands

due to *'being more yourself'*, improved relationships with parents, and less exposure to multiple unwell infants and distressed families.

Nurses commented how the SFR design was isolating for staff, with implications for managing workload, and communication with other nurses, including nurse education. Less social interaction among staff was reported in the SFR, with staff finding it difficult to find other staff members in the nursery and know what was happening in the nursery. Nevertheless, some nurses stated that the benefits to infants and families within the SFR outweighed any concerns regarding increased isolation.

DISCUSSION

Overall, there were few differences in employee adjustment across the two nurseries, however differences were found between the survey and interview results for some indicators. While overall job satisfaction did not differ between the units in the survey results, the interview results were consistent with previous research (Bosch et al., 2012; Smith et al., 2009; Stevens et al., 2010), with nurses describing increased job satisfaction resulting from improved relationships with parents, and the quality of parent-infant relationships in the SFR nursery. This likely explains the increased level of personal accomplishment reported in the SFR nursery, with interviews revealing the SFR energized some staff and increased nurse engagement.

Overall, supervisor and peer support remained unchanged between the two designs, consistent with Smith et al. (2009) who, despite a significant decline in nurse interactions, found no significant change in nurses' perceptions of leadership support and supervision. However, consistent with previous findings (Domanico et al., 2010; Smith et al., 2009; Walsh et al., 2006), nurses reported increased isolation in the SFR, with interviews identifying this was about difficulties finding assistance when needed and a decrease in nurse education and informal interactions. Nurses also reported significant increases in workload in the SFR nursery, supporting previous findings (Broom et al., 2015). The interviews provided details about what contributed to perceptions of increased workload, including increased walking, time spent individually in parent-education, and the inability to multi-task. More research is needed to examine potential strategies to manage workloads and increase nurse interaction in SFR nurseries, to avoid impacting longer term employee adjustment, teamwork, and nurse education.

Despite perceptions of increased workload and isolation, importantly no differences were found between the two nurseries for turnover intentions and emotional exhaustion, the first time these outcomes have been studied. However, using the MBI clinical cut-offs suggest slight increases in burnout within the SFR, consistent with comments in the interviews. Large variations in responses were found, with some nurses reporting high levels of burnout, which can be detrimental for staff (Aamodt, 2004), and patient care. Long term follow-up of nurses is needed to assess the impact of the SFR on burnout over time.

Overall, nurses stated that the SFR nursery provided a better quality environment for infants and their parents, and improved nurse-parent interactions, ameliorating the negative effects of increased workload and isolation for nurses. This may explain why personal accomplishment increased, while overall job satisfaction, turnover intention, and emotional exhaustion remained stable.

Limitations

While some nurses participated at both time points many did not, meaning we had a relatively small sample and few matched participants. Moreover, assessing attitudes and perceptions 6-10 months post move may not have captured the long-term impact of the transition from an OB to a SFR. Although we found no adverse effect of the move on nurses' job satisfaction, turnover intention or level of burnout, factors such as increased nurse isolation and workload may negatively impact nurses' wellbeing over time. Furthermore, nurses' enthusiasm and appreciation for the newness of the neonatal environment may diminish over time. Research should examine the longer term effects of SFRs on neonatal nurses.

Practical implications

While our study shows positive outcomes from the transition to SFR design for nurses, our findings also suggest key challenges for hospitals making this transition. First, units will need new approaches to staff education and social interaction that reflect the new nursery design and do not rely on informal or ad hoc arrangements. This includes new approaches to teamwork for the SFR environment that ensure nurses communicate patient information easily and effectively. In designing SFR nurseries and the organisation of work for individual staff, consideration also needs to be given to reducing the amount of walking. Such changes would address some of the workload and isolation issues found in our study and potentially improve outcomes for nurses longer term (Broom et al., 2015). In addition, nurses need strategies to manage the competing needs of different parents to ensure adequate care is provided for all families.

Conclusion

Limited research exists examining the impact of SFR nursery designs on neonatal nurses, and neither burnout or turnover have been examined. Our study examined nurses' perceptions of work demands and resources and their adjustment before and after transitioning from an OB to a SFR design. While the SFR increased nurses' isolation and workload, there was no evidence of an effect on nurses' burnout, turnover intentions or job satisfaction, and overall, nurses supported the move to a SFR design due to perceived benefits for parents and infants. These benefits appeared to explain increased feelings of personal accomplishment, as well as aspects of job satisfaction.

REFERENCES

- Aamodt, M.G., 2004. Applied Industrial/Organizational Psychology, fourth ed. Thomson/Wadsworth, California.
- Bakker, A.B., Demerouti, E., 2007. The job demands-resources model: state of the art. *J. of Managerial Psychol.* 22(3), 309-328.
<http://dx.doi.org/10.1108/02683940710733115>
- Bosch, S., Bledsoe, T., Jenzarli, A., 2012. Staff perceptions before and after adding single-family rooms in the NICU. *Health Environ. Res. and Des. J.* 5(4), 64-75. doi: 10.1177/193758671200500406
- Braithwaite, M., 2008. Nurse burnout and stress in the NICU. *Adv. in Neonatal Care.* 8(6), 343-347. doi: 10.1097/01.ANC.0000342767.17606.d1
- Broom, M., Gardner, A., Kecskes, Z., Kildea, S., 2015. How can we help staff transition to a new NICU design?, *J. of Neonatal Nurs.*
<http://dx.doi.org/10.1016/j.jnn.2015.05.004>
- Carlson, B., Walsh, S., Wergin, T., Schwarzkopf, K., Ecklund, S., 2006. Challenges in design and transition to a private room model in the neonatal intensive care unit. *Adv. in Neonatal Care.* 6(5), 271-280. doi: 10.1016/j.adnc.2006.06.008
- Cone, S.K., Short, S., Gutcher, G., 2010. From “baby barn” to the “single family room designed NICU”: a report of staff perceptions one year post occupancy. *Newborn and Infant Nurs. Rev.* 10(2), 97-103. doi: 10.1053/j.nainr.2010.03.002
- Domanico, R., Davis, D.K., Coleman, F., Davis Jr., B.O., 2010. Documenting the NICU design dilemma: parent and staff perceptions of open ward versus single family room units. *J. of Perinatol.* 30(5), 343-351. doi: 10.1038/jp.2009.195

Harris, D.D., Shepley, M.M., White, R.D., Kolberg, K.J.S., Harrell, J.W., 2006. The impact of single family room design on patients and caregivers: executive summary. *J. of Perinatol.* 26(S3), S38-S48. doi: 10.1038/sj.jp.7211583

Martin, A.J., Jones, E.S., Callan, V.J., 2005. The role of psychological climate in facilitating employee adjustment during organizational change. *European J. of Work and Organiza. Psychol.* 14(3), 263-289. doi: 10.1080/13594320500141228

Maslach, C., Jackson, S.E., Leiter, M.P., 1996. *Maslach Burnout Inventory Manual*, third ed. Consult. Psychol. Press, California.

Michael, D., 2012. Supportive supervisor communication as an intervening influence in the relationship between LMX and employee job satisfaction, turnover intentions, and performance. *J. of Behav. Stud. in Bus.* 5, 1-28.

Shepley, M.M., Harris, D.D., White, R., 2008. Open-bay and single-family room neonatal intensive care units: caregiver satisfaction and stress. *Environ. and Behav.* 40(2), 249-268. doi: 10.1177/0013916507311551

Smith, T.J., Schoenbeck, K., Clayton, S., 2009. Staff perceptions of work quality of a neonatal intensive care unit before and after transition from an open bay to a private room design. *Work.* 33(2), 211-227. doi: 10.3233/WOR-2009-0868

Stevens, D.C., Helseth, C.C., Khan, M.A., Munson, D.P., Smith, T.J., 2010. Neonatal intensive care nursery staff perceive enhanced workplace quality with the single-family room design. *J. of Perinatol.* 30(5), 352-358. doi: 10.1038/jp.2009.137

Stichler, F. F., 2012. The new standard: single family room design. *The J. of Nurs. Adm.* 42 (10), 447-450. doi: 10.107/NNA.0b013e31826a1cd2

Swanson, J.R., Peters, C., Lee, B.H., 2013. NICU redesign from open ward to private room: a longitudinal study of parent and staff perceptions. *J. of Perinatol.* 33(6), 466-469. doi: 10.1038/jp.2012.157

Walsh, W.F., McCullough, K.L., White, R.D., 2006. Room for improvement: nurses' perceptions of providing care in a single room newborn intensive care setting. *Adv. in Neonatal Care.* 6(5), 261-270. doi: 10.1016/j.adnc.2006.06.002

Watson, J., DeLand, M., Gibbins, S., MacMillan York, E., Robson, K., 2014.

Improvements in staff quality of work life and family satisfaction following the move to single-family room NICU design. *Adv. in Neonatal Care.* 14(2), 129-136. doi: 10.1097/ANC.0000000000000046

White, R., 2010. Single-family room design in the neonatal intensive care unit - challenges and opportunities. *Newborn and Infant Nurs. Rev.* 10, 83-86. doi: 10.1053/j.nainr.2010.03.011

Table 1. Nurse demographics.

	OB (n=22)	SFR (n=29)
	Mean±SD	Mean ±SD
	n(%)	n(%)
Age	42± 10.84 (range = 22-66)	42± 12.91 (range = 22-66)
Neonatal nursery experience	M = 13yrs 2 months ± 13.79 (range = 9 months – 27 years)	M = 11yrs 6 months ± 10.42 (range = 3 months to 30years)
Position		
Level 1 Midwife/Neonatal nurse	14 (63.6%)	18 (62.1%)
Level 2 midwife/neonatal nurse	7 (31.8%)	6 (20.7%)
Other	1 (4.5%)	5 (17.2%)
Employment status		
Part time	14 (63.3%)	15 (51.7%)
Full time	7(31.8%)	9 (31.0%)

Table 2. Means for employee adjustment, workload and support.

	OB	SFR				
	M (SD)	M (SD)	t	p	Cohen's d	Cronbach's Alpha
Job satisfaction	5.27 (1.28)	5.71 (1.01)	-1.36	0.18	0.38	-
Turnover intention	2.98 (1.61)	2.29 (1.62)	1.49	0.14	0.43	0.77
Emotional Exhaustion	16.64 (Low) (10.03)	19.72(Avg) (11.73)	-0.99	0.33	0.28	0.89
Personal Accomplishment	37.86 (Avg) (5.80)	41.61(High) (5.04)	-2.44	0.02*	0.69	0.65
Supervisor support	4.18 (1.05)	4.29 (1.13)	-0.36	0.72	0.10	0.95
Peer support	4.48 (.74)	4.54 (.90)	-0.27	0.79	0.07	0.93
Perceived isolation	3.00 (1.38)	4.37 (1.25)	-3.66	0.001**	1.04	0.87
Perceived workload	2.43 (.98)	3.13 (1.21)	-2.13	0.039*	0.64	0.91

Note. *p<.05, **p<.01

Table 3. Interview themes.

Theme	
Employee adjustment	<p><i>“More job satisfaction because you can engage with the family more, so you feel like you develop better relationships.”</i></p> <p><i>“The new hospital is refreshing to work at. I thought I'd be drained and hassled but it has given me a lift - it's so much better than the old.”</i></p>
Increased job demands	<p><i>“You can get tied up in a room and find it hard to get out to other parents”</i></p> <p><i>“It probably is a little bit more stressful at times if you can hear an alarm going off and can't get to it.”</i></p> <p><i>“Single rooms looking after four babies is very, very difficult.”</i></p> <p><i>“Yeah, it's not just about sitting here and you've got a couple of babies to look after, it's about walking miles, talking, organising”</i></p>
Decreased job demands	<p><i>“I actually think it has improved it because you can be a little bit more yourself.... you don't have to worry about being overheard...”</i></p> <p><i>“whereas now you can give her information and you can do the babies cares and you can take care of the baby and it can be very much family centred.”</i></p> <p><i>“ the entire place tends to be quieter because you've got less areas of focus of noise and busyness it's just .. better. I think having just that general overall feeling of being calmer probably reduces the stress”</i></p>
Job resources	<p><i>“It is very isolated for nurses, and I think we need time to chat to each other to support, motivate and encourage.”</i></p> <p><i>“it is often difficult to find staff to assist when required, and as a junior member of the team, I find this isolative.”</i></p> <p><i>“We are not as social anymore as what we used to be...The satisfaction or joy of seeing a few of your colleagues when you come in or thinking you're going to hang with a few colleagues is gone. Yeah, you do feel it.”</i></p> <p><i>“ You do work in a silo. You really need to communicate well. You need to be aware who is around you. You need to do an intentional rounding every couple of hours to make sure that everybody is okay and you are working as a team. “</i></p>