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Review

12 h shifts and rates of error among nurses: A systematic review

Jill Clendon [a,b,*], Veronique Gibbons [c,d]

[a] Victoria University, Wellington, New Zealand
[b] New Zealand Nurses Organisation, PO Box 1195, Nelson 7040, New Zealand
[c] Waikato District Health Board, Hamilton, New Zealand
[d] School of Nursing, University of Auckland, New Zealand

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ABSTRACT

Objective: To determine the effect of working 12 h or more on a single shift in an acute care hospital setting compared with working less than 12 h on rates of error among nurses.
Design: Systematic review.
Method: A three-step search strategy was utilised. An initial search of Cochrane, the Joanna Briggs Institute (JBI), MEDLINE and CINAHL was undertaken. A second search using all identified keywords and index terms was then undertaken across all included databases (Embase, Current contents, Proquest Nursing and Allied Health Source, Proquest Theses and Dissertations, Dissertation Abstracts International). Thirdly, reference lists of identified reports and articles were searched for additional studies. Studies published in English before August 2014 were included.
Findings: Following review of title and abstract of 5429 publications, 26 studies were identified as meeting the inclusion criteria and selected for full retrieval and assessment for methodological quality. Of these, 13 were of sufficient quality to be included for review. Six studies reported higher rates of error for nurses working greater than 12 h on a single shift, four reported higher rates of error on shifts of up to 8 h, and three reported no difference. The six studies reporting significant rises in error rates among nurses working 12 h or more on a single shift comprised 89% of the total sample size ($N = 60{,}780$ with the total sample size $N = 67{,}967$).
Conclusion: The risk of making an error appears higher among nurses working 12 h or longer on a single shift in acute care hospitals. Hospitals and units currently operating 12 h shift systems should review this scheduling practice due to the potential negative impact on patient outcomes. Further research is required to consider factors that may mitigate the risk of error where 12 h shifts are scheduled and this cannot be changed.

What is already known about the topic?

- 12 h shifts are a common shift pattern for nurses.
- Long work hours result in adverse nurse outcomes.
- The relationship between long work hours and adverse patient outcomes has been less clear.

What this paper adds

- The risk of making an error rates appears higher among nurses working 12 h or longer on a single shift in acute care hospitals.

* Corresponding author at: New Zealand Nurses Organisation, PO Box 1195, Nelson 7040, New Zealand. Tel.: +64 3 5463941.
E-mail address: jillc@nzno.org.nz (J. Clendon).

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- Hospitals and units currently operating 12 h shift systems should review this scheduling practice due to the adverse impact on patient and nurse outcomes.

1. Introduction/background

Work schedules should be optimised for both employees and patients. The introduction of 12-h shifts into rostering/scheduling systems has been one approach implemented in workplaces with the intention of improving the flexibility of work hours for nurses. The approach has proven popular, with many proponents citing good quality time off work, ease of travel to work, improved relationships with patients, and better family time as benefits (Estryn-Béhar et al., 2012; O'Connor, 2011; Richardson et al., 2007). However, there is significant debate in the literature regarding the disadvantages of 12 h or longer shifts with some authors claiming extended shifts cause increased fatigue, greater risk of errors, greater risk of injury to self, and negative physiological outcomes (Chen et al., 2011; Estryn-Béhar et al., 2012; Geiger-Brown and Trinkoff, 2010; Rogers et al., 2004; Scott et al., 2006), others claiming no difference in patient outcomes (Stone et al., 2006), and yet others attributing greater risk of error to poor scheduling practices rather than length of shift (Estryn-Béhar et al., 2012). Error (see below for further definition) can lead to poor patient outcomes, therefore it is essential there is a good understanding of associated links between shift length and error to ensure optimal patient outcomes can be achieved. This paper presents the results of a systematic review undertaken to examine the relationship between 12 h shifts and error.

2. Literature review

Previous reviews have explored links between shift length and patient outcomes with results described as inconclusive (Bae and Fabry, 2014; Estabrooks et al., 2009). Bae and Fabry examined the relationship between nurse work hours/overtime and nurse and patient outcomes. They determined there is strong evidence supporting a positive relationship between working long hours and adverse nurse outcomes; however, their findings regarding shift length were not definitive – while they note that working more than 8.5 h per shift is significantly related to adverse patient outcomes, they also state more evidence is required to draw a definitive conclusion on the links between long work hours and adverse patient outcomes. Bae and Fabry do not explicitly define or examine error, nor do they focus specifically on 12 h versus 8-h shifts. Estabrook et al. examined the effect of shift length on quality of patient care and/or health provider outcomes but were unable to determine a clear finding due to the poor methodological integrity of the studies included in the review. Their review did include a small number of articles that specifically examined error but this was not their main focus. A further review of interest was that undertaken by Wagstaff and Sigstad (2011) who examined the safety implications of shift and night work and long working hours. Their findings suggest that work periods greater than 8 h carry an increased risk of accidents that accumulates with every further hour worked, but again, the review was not specific to studies on nurses or nursing. Ker et al. (2010) considered the effect of caffeine in preventing injuries and errors in shift workers and found when compared with no intervention, caffeine improved cognitive performance and reduced the number of errors in shift workers. Other reviews have examined the prevention of clinical error (Hodgkinson et al., 2006), the effect of flexible working conditions on employee health and wellbeing (Joyce et al., 2010), and hospital nurse staffing models and patient and staff-related outcomes (Butler et al., 2010). None of these reviews looked specifically at 12-h shifts.

There is wide variation among the findings of existing research studies that have examined 12-h shifts as noted above and the lack of any systematic examination of the evidence of associations between 12-h shifts, nurses and error provide justification for undertaking this review. It is essential for hospital managers and nurses to understand the ramifications of selected shift scheduling systems to ensure optimal patient outcomes.

3. Aim

The aim of this systematic review was to determine the effect of working 12 h or more on a single shift in an acute care hospital setting compared with working less than 12 h on rates of error among nurses. The question posed was: what is the effect of working 12 h or more on a single shift in an acute care hospital setting compared with working less than 12 h on rates of error among nurses?

4. Method

The review is based on the Joanna Briggs Institute systematic review process. This approach covers search strategy, inclusion/exclusion criteria, methodological quality, results and data synthesis.

4.1. Search strategy

To avoid duplication, an extensive search of the Cochrane library and the Joanna Briggs Institute was undertaken to ensure there was no existing systematic review on this topic nor any under development. The search strategy aimed to find both published and unpublished studies. A three-step search strategy was utilised. An initial limited search of MEDLINE and CINAHL was completed followed by examination of the key words and phrases contained in the title and abstract, and of the index terms used to describe the study. A second search using all identified keywords and index terms was then undertaken across all included databases. Thirdly, the reference lists of all identified reports and articles were searched for additional studies.

The databases searched included:

- CINAHL
- MEDLINE
- Embase
- Current contents
- Proquest Nursing and Allied Health Source