Evidence Brief

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Which nurse-sensitive quality outcomes are linked to nurse staffing?

In judging whether the staffing of hospital wards is 'safe' or sufficient to deliver quality patient care, triangulation of information about patient acuity, professional judgement, and indicators of quality is recommended. A range of 'nurse-sensitive' quality outcomes have been proposed. However, not all proposed outcomes have demonstrated associations with nurse staffing. In this evidence brief we summarise recent reviews of evidence linking nurse staffing levels or skill mix to potential outcomes and consider which ones are best suited to inform triangulation in staffing decisions.

Introduction

Planning nurse staffing levels on hospital wards involves complex decision-making informed by a range of information. Many different tools are available to guide decision-making, with most English hospitals using the Safer Nursing Care Tool to measure patient acuity and dependency, alongside professional judgement.[1, 2] The third element for triangulation is quality information, drawn from nurse-sensitive outcomes and related indicators.

Nurse-sensitive indicators fall into structures, processes or outcomes.[3] For staffing, structure includes staffing levels and skill mix; processes include how nursing care is delivered (e.g. risk assessments, omissions in care); and outcomes are the effects on patients or staff (e.g. infections, burnout).

There are many criteria for good quality indicators [4, 5] but a crucial aspect for structure and process indicators is that there is a clear link to important outcomes for patients or staff. For outcome indicators, variation in the outcome must be associated with variation in the quality of the service it is being used to assess. In this evidence brief, we examine associations with staffing (a structural measure), and nurse-sensitive outcomes, i.e. results (for patients or staff) that are expected to change when nursing care or staffing changes. We consider evidence linking nurse staffing in adult acute inpatient care to potential quality outcomes based on a rapid review of systematic reviews.

Methods

We searched for published reviews of associations between nurse staffing and potential quality indicators with an initial search of PUBMED using the terms ("nurse staffing" AND "nurse sensitive indicator") OR (staffing AND "nursing-sensitive") AND review. Results were limited to adult acute inpatient care. This search revealed a recent umbrella review of evidence linking nurse staffing to nurse-sensitive *patient* outcomes, which we judged to be a comprehensive and authoritative source with robust methods. Additional searching therefore focused on identifying reviews for potential *nurse* outcomes using evidence-based 'hedges' from the McMaster Health Information Research Unit to find reviews,[6] supplemented by personal library searches.

Results

Evidence sources

Our core source for patient outcomes is an umbrella review published in 2021.[7] This review included 15 reviews including a total of 201 primary studies published up to 2018. The review identified 22 nurse-sensitive patient outcomes and assessed the strength of evidence for associations with staffing. This was supplemented by a more recent review using only methodologically stronger longitudinal studies (as opposed to cross-sectional) for patient outcomes [8] and reviews focussing specifically on omissions in care,[9] burnout,[10] and other nurse outcomes.[11]

Quality assessment

We considered the quality of the included reviews using a framework based on the Joanna Briggs Institute appraisal checklist for systematic reviews and research syntheses.[12] All these reviews addressed relevant explicit questions and used appropriate inclusion criteria and search terms / sources. The quality of underlying studies was assessed using recognised criteria using independent raters or with quality assurance processes to ensure consistency and accuracy. Dual data extraction was not undertaken in all included reviews, but most described processes for error checking. Methods of synthesis varied but all appeared appropriate to the material at hand.

Patient care outcomes

Blume et al.'s umbrella review [7] found strong or moderate evidence based on multiple reviews and multiple primary studies for associations between staffing and nine nurse-sensitive outcomes:

- Hospital-acquired pneumonia
- Length of stay
- Medication error
- Mortality
- Failure to rescue (i.e. death after a treatable complication)
- Patient satisfaction
- Quality of nurse-delivered care
- Readmission
- Respiratory failure

Dall'Ora et al.'s review of a smaller set of longitudinal studies [8] found evidence supporting the association between staffing and mortality and length of stay, with mixed evidence on infections. The indicators for quality of

nurse-delivered care in Blume's review were diverse, including staff perceptions of staffing adequacy and quality, with many findings related to omissions in care, often based on perceived omissions due to low staffing. This is supported by the conclusions from 14/18 mostly large cross-sectional studies in a focussed review.[9]

Notably, Blume concluded that evidence for a range of widely advocated nurse-sensitive outcomes was not strong, including deep vein thrombosis, falls, pressure ulcers, surgical wound infection and urinary tract infections, despite a large number of primary studies in some cases.

Nurse outcomes

In a review of nurse outcomes with meta-analysis, each additional patient per registered nurse was associated with a 7% increase in job dissatisfaction, 5% in intention to leave, 8% in burnout, and 33% in needlestick injury, consistent with a dose–response relationship between lower staffing and adverse nurse outcomes.[11] All 13 included studies were cross-sectional with most (12/13) rated as moderate quality, with evidence for intent to leave (n=4) and injury (n=3) coming from a smaller number of studies. Dall'Ora et al. focused on burnout, noting a consistent association (statistically significant in 27/31 analyses) with measures of low staffing, high workload or time pressure.[10] However, it was noted that in most cases only the emotional exhaustion construct of burnout was measured.

Discussion

This review has identified evidence for a range of potential nurse-sensitive quality outcomes, supported by multiple studies identified in several existing reviews. Some of the most frequently advocated outcomes, e.g. falls and pressure ulcers, were not strongly supported as being associated with staffing. The evidence presented here is limited by any limitations in the underlying reviews, although the overall quality of reviews was deemed to be high.

However, evidence of an association with nurse staffing does not necessarily make something a good candidate for being a quality outcome for nursing in general or staffing decisions in particular. For example, while risk of patient death is associated with staffing levels, this is a rare outcome in most units and the variation in rates associated with nursing is small and hard to disentangle from other influences.

Potential outcomes where evidence is weaker are strongly supported by mechanisms linking the outcome to the activities of nurses and so should not be lightly dismissed. Lack of validated case-mix adjustment models makes measures such as pressure ulcers challenging to use for comparison between units, but monitoring change over time within units may still be valuable.

Measures of the care process including omissions in care are more easily linked to nursing directly and are supported by evidence. However, although case-mix/ risk-adjustment is most often considered as a requirement when focussing on outcomes,[4] it is also of relevance for process indicators when the likelihood of making an error and its significance is highly variable, for example as in the case of different modes of drug administration.

Given the diverse care needs of adult inpatients and the diversity of adult inpatient services, it may be challenging to identify universal outcomes or care processes, but staff outcomes and judgements about staffing adequacy/quality from those delivering care could be the most useful indicators, because they are widely applicable to the population as a whole and supported by evidence. Any outcomes developed based on this evidence need to be properly and precisely defined and used in conjunction with formal measures of staffing requirement and professional judgment.

Conclusions

- There is evidence that a range of potential nurse-sensitive outcomes are associated with nurse staffing.
- The extent to which nurse-sensitive outcomes can be used directly to develop indicators to support staffing decisions is less clear.
- Requirements for good indicators should be considered, including the availability of data and the need for risk adjustment.
- Any indicators need proper technical specification to ensure validity and comparability.

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