A detailed review: A association between nursing staff and omissions

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Abstract

Aims: To identify the most often missed nursing care in acute adult inpatient wards, and to establish whether there is a link between nurse staffing and missing care.

Background: In-hospital mortality, for example, has been linked to low nurse staffing levels in studies. To complicate matters, it has been suggested that the lack of enough nurse staffing may be shown more directly by the omissions of nursing care (also known as "missed care," "care left undone," or "rationed care").

Data Sources: For quantitative studies examining the link between understaffing and missing care, we turned to the Cochrane Library, CINAHL, Embassy, and Medline databases. Key journals, personal libraries and reference lists of papers were scanned for relevant articles.

Review Methods: The studies were identified by two reviewers. The quality assessment was based on the quality rating criteria for studies reporting correlations and associations developed by the National Institute for Health and Care Excellence. The study's concept, frequency of compassion fatigue, and measurements of relationship were all abstracted. Narrative was used in the synthesis process.

Results: Subjective accounts of missing care were collected from 18 research. Nearly a third of all nurses admitted to neglecting certain aspects of patient care. One of the strongest links between greater rates of missed care and lower nurse staffing levels was discovered in 14 different research investigations. Adding support employees to the team did not seem to lessen the amount of care that was missed.

Conclusions: Hospitals with low Registered Nurse staffing are more likely to report missing nursing care. An indication of nurse staffing adequacy is missed care. A closer look is needed to see whether the correlations found are in fact failures.

KEYWORDS: Care left undone, hospital, implicit rationing and missed care, nursing staff, quality, skill mix, systematic review and workforce.

1. Introduction

There is a substantial body of data linking hospital nurse staffing levels with better patient outcomes. The length of a patient's hospital stay and other circumstances may all have an impact on how well they do after they leave the hospital. Missed nurse care is now being investigated as a factor in poor patient outcomes. A possible indication of hospital nursing care quality is missed care according to the researchers. It is important to gain a detailed knowledge of an influence of nurse staffing on patient safety in light of worldwide estimates of a shortage of nurses by 2025. Worldwide interest in finding out how hazardous staffing in a hospital affects the mechanisms and all potential results also exists.

2.   Literature survey

Low nurse staffing levels have been linked to a higher death rate in hospitals. However, this research has had a considerable influence and has been used to push for greater nurse staffing levels, including statutory minimums, although the causal relationship between nurse staffing levels and outcomes remains contested. For the vast majority of patient outcomes, causality can only be inferred in a limited and indirect way.

Since a study found an association between missing nursing care and worse patient outcomes, the term "missed nursing care" (KNL) has gotten a lot of attention. Investigations of possibly preventable fatalities in hospitals show how nursing staff omissions may have major negative repercussions. Patients' vital signs, early symptoms of deterioration, communication of aberrant observations and/or a sufficient reaction are usually related with unnecessary fatalities in the hospital according to research.

Because of this, it has been proposed that nurse staffing levels affect mortality rates by omitting vital treatment, such as monitoring to detect and prevent deterioration. Nurses may be forced to participate in what is known as "implicit rationing" if they are unable to accomplish all required care tasks due to their heavy workloads. As a good indicator that could more sensibly indicate issues arising from low staffing before they are detected through poor outcomes, missed nursing care has been proposed as a potential quality indicator linked to the adequacy of nursing staffing.

- The National Institute for Health and Care Excellence's safe staffing recommendations for adult hospital wards highlighted the importance of nurse staffing in ensuring patient safety.
- It has been noted by the National Institute for Health and Care Excellence that additional research is needed on measures that reflect more directly the influence of nurse staffing on patient outcomes.

How should the findings be used to influence policy/practice/research/education?

- It is possible to use missed care as an indication of the quality of the care that is being provided.
- One way to minimise missing treatment is to keep personnel numbers at an acceptable level.

Nursing activities may be difficult to evaluate and are frequently not regularly gathered by healthcare providers, thus although evidence on the link between nurse staffing levels and patient outcomes is vast and carefully reviewed, research on missing nursing care is relatively limited. There are, however, an increasing number of researches looking at the connection between a shortage of nurses and patient harm. There have been previous studies that looked at variables connected to missing care, but no comprehensive investigation of the connection with staffing has been conducted.

3.   Methodology

It was the goal of this study to identify the most often missed nursing care tasks in acute hospitals' adult inpatient wards and to evaluate whether missed care is associated with a nurse staffing shortage.

Two questions guided the review to reach the aims:

1. As reported by staff, patients, or administrative statistics, what are the most often neglected nursing care activities in adult inpatient wards in acute care hospitals?

2. What are the correlations between nurse staffing levels and missed care in acute hospital adult inpatient wards?

- **Design:**

Study participants were asked to identify the correlation between nurse staffing levels and skill mix and missing treatment in general medical/surgical wards in acute care hospitals.

  NICE's guidelines for the development of public health were followed in conducting the review of the study (2012). We chose this method since we expected much of our study to be observational.

- **Search methods**

Nurse staffing literature was thoroughly examined and reviewed, and further searches were conducted for particular keywords linked to missing care (missed care and unfinished care, implicit rationing and care left undone). Databases of grey literature were searched in the CEA registry and the CDSR and CDSR databases as well as Medline containing In-Process and NHS EED and HEED (including the HMIC database and those held by the National Institute for Health and Care Excellence [NICE]). Only articles published after 2006, when the

phrase "missed care" was first used by Kalisch in his research, were considered for the search (2006). Searches of academic journals, personal libraries, and reference books were performed by hand. Up till June 2016, the first round of searches had been conducted. Even though we can only be certain that our coverage was complete up to June 2016, further research during the final writing of the report revealed that no significant additional studies had been published since then.

It was our intention to include primary research articles that examined the relationship between nurse staffing, such as RN hours per patient day or the nurse-to-patient ratio, and missing or delayed care in acute hospital wards, as well as the ratio of RN to all hands-on caretakers. There were no studies included that were conducted just in highly specialised units with unusual personnel (such as an ICU). Omissions (e.g. medication mistakes) were omitted from studies reporting composite error rates if the rate of omissions could not be distinguished from other errors. Prospective or retrospective observational studies, cross-sectional analyses, and longitudinal investigations were among options we investigated.

Initially, just one reviewer (AR) screened the titles and abstracts for their relevancy. Studies that were found to be relevant were selected by two reviewers who worked separately to examine the list of candidates. Initial discrepancies on the inclusion of research were modest; disagreements were addressed via discussion (1 study in 18 required any discussion).

A total of 11,269 sources were turned up throughout our investigation. A total of 127 papers were selected as needing additional evaluation after removing duplicates and a quick screening for relevance (title only). A second round of abstract screening yielded 57 papers that were maintained for a full text examination. According to a thorough review, 40 papers were deemed ineligible for inclusion because of their type (e.g., a discussion or review) (N = 7); not measuring the associations between nurse staffing (N = 25); not adult medical/surgical wards (N = 1); reporting medication errors without distinguishing errors due to delayed or omitted administration from those due to administering the wrong drug or dosage (N = 7) (see Figure 1).

- **Data abstraction Data**

Sample parameters (staff and patient size), staffing metrics (prevalence of nursing chores missed), and association/effect measurements were all abstracted. Whenever feasible, we obtained the precise p value and the point estimate, as well as the confidence interval. In cases where the information supplied by the authors was insufficient, we included the information that was available.

- **Synthesis**

The way missing care was measured and the questions that were asked varied amongst instruments. "number of necessary nursing tasks for patients withheld or otherwise not performed in the last seven working days," "frequency of care missed on unit by all of the staff (including yourself)," and "on your most recent shift, which of the following activities [13-item list] were necessary but left undone because you lacked the time to complete?" ". Table 2 provides a breakdown of the elements. In the QTDS, patients were asked whether any of the six aspects of discharge information was requested but was not provided.

Since there are many different methods for determining missed care (e.g., the number of elements in each instrument and the time period in which missed care occurred), we ranked the frequency with which missed care items were reported in order to compare the relative frequency across research. We estimated missing care if other research have done so using the same tool.
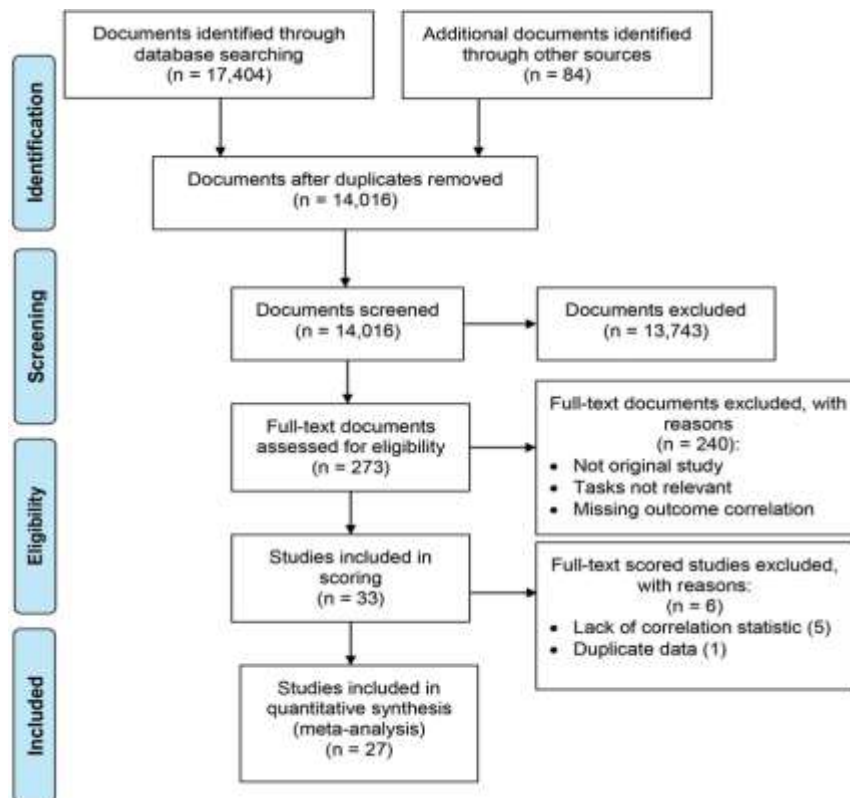
FIGURE 1. Study selection flow chart

Each item's average rank. A scale rating of "always," or "often," was deemed a sign of "missed care." In order to avoid overemphasising items from instruments used in just one research, we only included data from instruments that have been used in numerous studies or studies with a large sample of hospitals (10+) and nurses (1,000+). This ensured that the findings would not be impacted by previous research that used a unique instrument with a limited sample size. Unclassified care items were categorised as clinical, planning and communication or unclassified based on RN4Cast factor analysis (Bruyneel et al., 2015). At least three separate groups all agreed that the same item should be placed in one of two categories. Rankings were transformed to centiles such that the highest-scoring item was always 100 and the lowest-scoring item was always 0 in order to generate a similar statistic. Analyzing variance using Kruskall–Wallis (nonparametric) analysis of variance was used to compare the positions of the candidates (Minitab v 17.3).

4. RESULTS

This review included eighteen papers that fulfilled the inclusion criteria. As a result of the large national representative samples of hospitals and nurses, seven studies were rated as having good external validity. The level of bias in all of the studies was at least considerable (internal validity). Table 1 provides an overview of the studies that were included. Every study was cross-sectional. From 232 to 31,627 registered nurses were included in the study, with the majority being the smallest possible sample size (RNs).

In spite of the fact that some included healthcare support workers (HCSW) such as nursing assistants and certified vocational nurses in the nursing profession. Nurse to patient ratio (12 studies), nursing hours per day per patient (NHPPD or RNHPPD) (three studies) or the number of patients cared for in the past shift were all used to report staffing levels (three studies). There were four studies that looked at the skill mix. Six other studies utilised data from the RN4Cast project, including one for England, one for Germany, one for Sweden, and one for Switzerland (Schubert et al. 2013). Although these publications focus on different elements, there is a lot of overlap and single country data is nested in the multi-country analysis, thus these seven studies are not completely independent.

Table 1 Summary of included studies.

Reference	Study design	Interventions	Results	p	Quality score
			Trauma and burns		
Clifton 1985 [72]	RCT, 2 weeks, n = 20 severe head injury inpatients	isoenergetic EN ~3500 kCal Group 1: 1.5 g·P/kg Group 2: 2.6 g·P/kg	nitrogen intake (g/kg) Group 1: 0.24(0.04) vs. Group 2: 0.42(0.09)	<0.01	O
			nitrogen loss (g/kg) Group 1: 0.36(0.08) vs. Group 2: 0.49(0.11)	<0.01	
			nitrogen balance, body weight, serum albumin, creatinine-height index, lymphocyte count	NS	
Demling 1998 [67]	RCT, 3 weeks, n= 15 rehabilitation inpatients post severe burns	oral diet with supplement drink Group 1: 1.3 - 1.5 g·P/kg Group 2: 1.7 - 2.0 g·P/kg	protein intake (g/kg) Group 1: 1.4(0.1) vs. Group 2: 2.1(0.2)	<0.05	+
			weight gain (kg/week) Group 1: 0.59(0.09) vs. Group 2: 1.22(0.05)	<0.05	
			able to complete physiotherapy without fatigue at week 2 (score/10) Group 1: 3(1) vs. Group 2: 6(1)	<0.05	
			able to complete physiotherapy without fatigue at week 3 (score/10) Group 1: 5(1) vs. Group 2: 8(2)	<0.05	
			non-protein energy intake, initial weight loss, mortality, infections, hospital LOS	NS	
Huang 1990 [73]	RCT, 2 weeks, n = 60 acute head injury inpatients	non-isoenergetic EN Group 1: 1.5 g·P/kg with energy 30 - 35 kCal/kg Group 2: 2.0 - 2.5 g·P/kg with energy 1.9 xBEE Group 3: 2.5 - 3.0 g·P/kg with energy 1.9 xBEE	protein intake (g P/kg) Group 1: 1.4(0.06) vs. Group 2: 2.2(0.03) vs. Group 3: 2.6(0.06)	<0.01	O
			weight loss (%IBW) Group 1: 11.8(1.8) vs. Group 2: 4.2(1.0) vs. Group 3: 8.1(1.0)	<0.01	
			albumin, ferritin, creatinine height index, lymphocytes, GCS on discharge, 6-month outcome	NS	
Larsson 1990 [64]	RCT, 8 days, n = 39 trauma or burn inpatients	isoenergetic PN Group 1: 0 g·P/kg Group 2: 0.6 g·P/kg Group 3: 1.2 g·P/kg Group 4: 1.6 g·P/kg Group 5: 1.9 g·P/kg	nitrogen balance (g) Group 1: −13.8(0.5) vs. other groups (Group 2: −6.0(0.6); Group 3: −5.1(2.5); Group 4: −4.0(1.0); Group 5: −4.5(1.0))	<0.001	+
			urinary nitrogen loss (g) at day 8 Group 1: 14.3(1.4) and Group 2: 12.5(1.4) vs. other groups (Group 3: 23.3(3.2), Group 4: 25.1(1.5), Group 5: 30.7(1.5))	<0.05	
			nitrogen retention (%) at day 8 Group 1 vs. other groups (Group 3: 38.7(15.9), Group 4: 44.5(5.4), Group 5: 27.1(3.4)). Group 1 vs. Group 2 NS.	<0.05	
			urea (mmol/L) at day 8 Group 1: 4.6(0.7) and Group 2: 7.1(1.3) vs. other groups (Group 3: 12.1(2.4), Group 4: 11.0(2.4), Group 5: 10.4(1.2))	<0.01	
			glucose, creatinine, body weight, albumin, urea, muscle ATP, urinary 3-methyl histidine excretion	NS	
Serog 1982 [66]	RCT, 12 days with crossover (3 days each), n = 24 severe burns inpatients	isoenergetic EN ~4000 kCal Group 1: ~2 g·P/kg Group 2: ~4 g·P/kg	nitrogen intake (g) Group 1: 21.12(0.85) vs. Group 2: 40.07(1.35)	<0.001	++
			nitrogen balance (g) Group 1: −0.09(2.89) vs. Group 2: +19.33(1.87)	<0.001	
			nitrogen output, weight, energy intake, energy expenditure, respiratory quotient	NS	
Twyman 1985 [62]	RCT, 10 days, n = 21 head injury inpatients	isoenergetic EN ~3000 kCal Group 1: 1.5 g·P/kg Group 2: 2.2 g·P/kg	nitrogen balance (g) Group 1: −3.23(0.59) vs. Group 2: 1.6(0.58)	0.006	+
			cumulative nitrogen balance (g) Group 1: −31.2(5.31) vs. Group 2: 9.2(4.91)	0.04	
			protein intake (g P/day) Group 1: 1.5(0.0) vs. Group 2: 2.2(0.1)	<0.0001	
			energy intake	NS	
			urinary urea nitrogen (g/day) Group 1: 21.0(0.52) vs. Group 2: 26.3(0.55)	0.03	
Wolfe 1982 [74]	RCT, 6 days with crossover (3 days each), n = 6 severe burns inpatients	isoenergetic EN or PN ~40 kCal/kg Group 1: 1.4 g·P/kg Group 2: 2.2 g·P/kg	plasma leucine oxidation (μmol/kg) Group 1: 56 vs. Group 2: 76	<0.05	O
			protein synthesis, protein catabolic rate, protein balance, oxygen consumption, respiratory quotient	NS	
			Critical illness		
Greig 1987 [70]	RCT, 1 week, n = 9 septic inpatients on parenteral nutrition	isoenergetic PN ~2250 kCal Group 1: 1.19 g·P/kg Group 2: 2.29 g·P/kg	protein oxidation (kCal/kg) Group 1: 4.7(0.6) vs. Group 2: 8.3(1.1)	<0.05	+
			urea (mmol/L) Group 1: 7.3+/−2.8 vs. Group 2: 8.4+/−1.2	<0.05	
			nitrogen balance, glucose, fatty acids, insulin and triglycerides	NS	

FNS

RN4CAST, a study of 31,627 nurses from 488 hospitals in 12 European countries, found that nurses who cared for more than 11 patients had a 26% higher risk of leaving care undone than nurses who cared less than 6 patients (OR = 1.26; 95 percent CI = 1.23–1.29). Further multi-country studies utilising the number of care items missed as the result of this research showed this strong relationship (Ausserhofer, et al., 2014; Bruyneel, et al., 2015). In England (Ball, et al., 2014) and Sweden (Ball, et al., 2016), statistically significant relationships between reduced staffing and greater levels of missed care were reported; however, findings from Germany (Zander, et al., 2014) and Switzerland (Schubert, et al., 2013) were more ambiguous. Nurses caring for 6.1 or less patients had a 66% reduced risk of missing care than nurses caring for 11.7 or more patients in England (OR = 0.34, 95% CI 0.22–0.53). In Sweden, shifts with fewer than six patients per RN were related with a 53% decrease in the likelihood of care being left unattended (OR = 0.47, p .001). Each extra patient per nurse was associated with a 3% increase in reports of missed patient surveillance, skincare, and on-time delivery of medicine (OR = 1.03 p .01), although there were minor but significant relationships in the reverse way, indicating no overall link. The patient-to-nurse ratio was only related with missing care in an uncorrected model

in Switzerland, however. The link was no longer significant when probable confounders were taken into account, although there was still a substantial correlation between nurse-perceived staffing adequacy and patient outcomes.

In other nations, the same thing happened. A cross-sectional study of 3,037 RNs in South Korea revealed that the RN4CAST measure (OR = 1.03; p .001) showed a 3 percent increase in the likelihood of care left undone for every extra patient (p .001). (Cho and colleagues, 2016) It was shown that higher nurse-to-patient ratios (1:7 vs. 1:17) were related with fewer missing nursing care (b = 0.136; p.02) (Cho et al., 2015) (Cho et al. At 12 Italian hospital units, a smaller patient load was linked to fewer missed care opportunities (OR = 0.91; p .05). Most nursing duties had weak negative associations with nurse staffing levels in Kuwait, with educating patients/families having the largest link (r =.12; p .005). Moderate or high bias risk was found in all of the research included.

More patients meant more missed treatment, according to a survey of 4,861 nursing personnel in 10 hospitals in the United States (b = 0.015; p .001). For the study of the human brain. A second study indicated that fewer patients missed care when nurses worked longer shifts each day (b = 0.45; p =.002). This is based on the findings of Kalisch et al. (2011). As a result, we could not determine whether or not these investigations were really independent. Similar results were found in lower-quality research, although the results were more contradictory. The total number of missed nursing care points increased by 2.1% in oncology units across nine hospitals (p .05) for every additional patient cared for by RNs and HCSWs, and a single hospital study found a weak positive correlation between the number of patients per nurse and the number of missed care points (r =.246, p .000). """"""""""""""""""""" At contrast, a research conducted in two hospitals in the United States and Lebanon (Beirut) revealed that the number of patients treated was not a significant predictor of missed treatment.

A high or moderate risk of bias was detected in research based on patient accounts, however the findings were mixed. Findings from an investigation of 729 patients in two US hospital systems showed no link between patient claims of missing treatment and the number of nurses on duty per patient day (r =.14, p =.02). No correlation was identified between RNHPPD non-overtime hours and patient reports of receiving essential discharge information (b = 0.05, p =.74) in a survey of four US hospitals.

5. DISCUSSION

Many nations have researched the correlation between "missed care" and nurse staffing levels in hospitals. All the studies we found utilised subjective measures of missing care, with most relying on nurses' retrospective recollections. Missed appointments were common, according to the data. Planning and communication aspects were more often reported as missing than clinical care, despite the fact that complaints of missing critical clinical procedures and patient monitoring/observation were remained commonplace.. Almost all studies indicated a link between greater rates of missed care and lower nurse staffing levels. RN staffing levels have been the focus of most investigations. However, one research indicated that when HCSW staffing levels were very high, the degree of missing care decreased. This contradicts the findings of other studies that found no benefit or a negative impact from larger numbers of support workers.

The relationship between nurse staffing numbers and patient safety results has long been hypothesised to be one of the driving forces for the growing interest in missed care nursing. An essential aspect of the argument that these relationships between staffing and outcomes are causal is the idea that inadequate staffing leads to high mortality through missing chances to recognise and prevent deterioration (Clarke & Aiken, 2003; Griffiths, et al., 2016). However, despite growing interest in utilising missing care as a leading quality indicator, existing subjective metrics based on sporadic survey do not easily adapt themselves to regular quality monitoring.

Staffing levels are unlikely to have a direct impact on poor outcomes such as death on the kind of care that patients most commonly report being missing, such as conversing with and consoling them. It's possible that the lack of attention to these areas of care is due to a focus on clinical treatment due to personnel shortages, but other, less noble motives, such as deference to medicine, have been mentioned as well (Papastavrou et al., 2014). Despite this, the observed levels of clinical care omission remain high. The relative relevance of the care that is neglected is not taken into account when using broad measurements of missing care. Missed care is not all of the same importance, and the influence on a patient's prognosis will differ according to this (Recio-Saucedo et al., 2017). Direct evidence of missed clinical treatment mediating the association between staffing and mortality is lacking, despite evidence that missed care mediates the relationship between staffing levels and measures of patient satisfaction and falls (Jones et al., 2015).

Studies evaluated here typically suggest a link between staff levels and missed care, but none investigated an association between staff numbers and any objective assessment of care. Despite the fact that nurse reports of missing care are linked to poor patient outcomes, it is not apparent to what degree these reports correspond with

real omissions of care. Studies that failed to reveal significant relationships were smaller and had a greater risk of bias, while those that relied on patient accounts did not convincingly support the findings of studies that relied on nurse reports. Comparisons across research are hampered by the wide range of measurement procedures and analytical techniques used. One study's "dramatic" impact size (Ball et al., 2016) may be extrapolated to get a range of 89% to 75% decrease in the likelihood of patients reporting missing care in better-staffed units. This is because of a reported 66% drop in chances. Although there may be a link between reported missing care and staffing levels, it seems that most missed care cannot be ascribed to insufficient staffing.

6. CONCLUSION

While reported missed care is associated with nurse staffing levels and such reports may indeed be indicators of inadequate nurse staffing, there is no research demonstrating associations with objective measures of care. The extent to which the relationships observed in these studies represent actual omissions of care and the consequences of such failures, remains largely investigated. Given the potential consequences of missed care, its incidence/ prevalence may serve as an indicator of care quality and maintaining adequate staffing levels is a mechanism to avoid missed care. While the association between staffing and missed care is substantial it is unlikely that most care omissions are directly linked to staffing levels only. Reports of missed care cannot in themselves be used to track nurse staffing adequacy, although changes in the rate or frequency or reports could indicate nurse staffing problems. Future research should focus on objective measures of missed care on patient outcomes.

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