International Journal of Nursing Studies 100 (2019) 103403

Contents lists available at ScienceDirect

International Journal of Nursing Studies

journal homepage: www.elsevier.com/ijns

Conceptual and methodological challenges of studies examining the determinants and outcomes of omitted nursing care: A narrative review of the literature

Christian Vincelette[a,b,*], Maureen Thivierge-Southidara[c], Christian M. Rochefort[a,b,d]

[a] School of Nursing, Faculty of Medicine and Health Sciences, Université de Sherbrooke, Sherbrooke, Québec, Canada
[b] Research Centre Charles-Le-Moyne-Saguenay-Lac-Saint-Jean sur les innovations en santé, 150 Place Charles-Le Moyne, Longueuil, Québec J4K 0A8, Canada
[c] Université de Montréal, Faculté de Médecine, Montréal, Québec, Canada, 2900 Boulevard Édouard-Montpetit, Montréal, Québec H3T 1J4, Canada
[d] Research Centre du Centre Hospitalier Universitaire de Sherbrooke, 150 Place Charles-Le Moyne, Longueuil, Québec J4K 0A8, Canada

ARTICLE INFO

Article history:
Received 4 April 2019
Received in revised form 30 July 2019
Accepted 19 August 2019

Keywords:
Omitted nursing care
Nurse staffing practices
Patient outcomes
Narrative review
Registered nurses

ABSTRACT

Background: Over the past two decades, several studies have examined the determinants and outcomes of omitted nursing care in hospitals and other settings. These studies have raised several challenges associated with the definition and measurement of this phenomenon which must be addressed to move the field forward. However, these challenges remain scattered throughout the literature.
Objectives: To synthesize the conceptual and methodological challenges of studies examining the determinants and outcomes of omitted nursing care, and to identify avenues for further research.
Method: A narrative review of the literature was conducted. Relevant studies published between 2001 and 2018 were identified using four electronic databases: CINAHL, Medline, Cochrane Library and Health Management Database. Study selection, data extraction, and synthesis were carried independently by two authors following a standardized protocol, and discrepancies were resolved by consensus. Thematic analysis was used to summarize and characterize the main conceptual and methodological challenges identified.
Results: Our initial search yielded 5214 citations of which 52 primary studies and 7 literature reviews met our inclusion criteria. Six conceptual and methodological challenges were identified, the: 1) use of self-reported measures; 2) use of cross-sectional designs; 3) multidimensional nature of omitted nursing care; 4) interdisciplinary and collaborative nature of health care, 5) content validity of existing instruments and, 6) multiplicity of conceptual definitions.
Conclusion: We identified six challenges that characterize studies on the determinants and outcomes of omitted nursing care. For each, several solutions are proposed. To strengthen this body of evidence, patient-level longitudinal studies should be pursued. It is also required to develop and validate more objective measures of omitted nursing care. Developing such measures must involve registered nurses at the bedside, to ensure their feasibility and acceptability.

What is already known about the topic?

- Previous studies have provided ecological evidence that suboptimal nurse staffing practices are associated with increased risks of adverse events in acute care settings.
- Omitted nursing care has been shown to mediate the associations between suboptimal nurse staffing practices and poor patient outcomes.
- Several important conceptual and methodological challenges are associated with the omitted nursing care, but these remain scattered throughout the literature.

What this paper adds

- This paper summarizes six important conceptual and methodological challenges that characterize studies examining the determinants and outcomes of omitted nursing care.
- For each identified challenge, several potential solutions are proposed, and areas for further research are identified.
- To move the field forward, there is a strong need for longitudinal studies that use objective and multidimensional measures of omitted nursing care.

* Corresponding author at: School of Nursing, Faculty of Medicine and Health Sciences, Université de Sherbrooke, Sherbrooke, Québec, Canada.
E-mail addresses: christian.vincelette@usherbrooke.ca (C. Vincelette), maureen.thivierge-southidara@umontreal.ca (M. Thivierge-Southidara), christian.rochefort@usherbrooke.ca (C.M. Rochefort).

https://doi.org/10.1016/j.ijnurstu.2019.103403
0020-7489/

1. Introduction

For more than 30 years, studies have provided evidence that suboptimal nurse staffing practices (e.g., lower registered nurse to patient ratios, leaner registered nurse skill mix) and non-supportive work environments are associated with poorer patient outcomes in hospitals and other settings (Driscol et al., 2018; Kane et al., 2007; Numata et al., 2006; Needleman et al., 2011). While it was long hypothesized that these associations were mediated by nursing care processes, it is only recently that these processes have become a real focus of research (Aiken et al., 2001; Kalisch et al., 2009; Schubert et al., 2007; Sochalski, 2004).

Indeed, Linda Aiken and her collaborators coined the term *care left undone* in 2001 to refer to the processes of nursing care that are not completed at the end of a work shift (Aiken et al., 2001). A few years later, Maria Schubert et al. introduced the concept of *implicit rationing of nursing care*, defined as: "the withholding or failure to carry out necessary nursing tasks due to inadequate time, staffing level/or skill mix" (Schubert et al., 2008). Since then, several other primary concepts have appeared in the literature (i.e. *missed care*(Kalisch et al., 2009), *priority setting*(Hendry and Walker, 2004)). While there is no consensus about the definition of this phenomenon (Papastavrou et al., 2014a), despite the use of distinct terminology, these terms have similar definitions and are often used interchangeably (Jones et al., 2015). Indeed, conceptual frameworks associated with these concepts aim to assess the same phenomenon (Jones et al., 2015). For the rest of this text, and for clarity purposes, we will use the expression "omitted nursing care" as an overarching concept to refer to this phenomenon.

Over the past decade, the phenomenon of omitted nursing care has received a great deal of research attention (Srulovici and Drach-Zahavy, 2017). Prevalence rates ranging from 55% to 98% across various patient populations and settings have been reported (Griffiths et al., 2018; Jones et al., 2015). Moreover, studies examining the determinants and outcomes of omitted nursing care also found empirical support for its role as a mediator of the association between nurse staffing/work environment characteristics and patient outcomes (Ball et al., 2018; Jones et al., 2015; Papastavrou et al., 2014a; Recio-Saucedo et al., 2018). While these studies have made important contributions to the field, they have also raised several important conceptual and methodological challenges inherent to investigating the phenomenon of omitted nursing care. However, these challenges remain scattered throughout the literature. Therefore, we aim to contribute to the field by: 1) synthesizing the conceptual and methodological challenges of the studies examining the determinants and outcomes of omitted nursing care, and 2) identifying potential solutions to these challenges along with avenues for further research.

2. Methods

2.1. Design

A narrative review of the literature was conducted (Gasparyan et al., 2011).

2.2. Search strategy and inclusion criteria

The electronic search for relevant studies was performed using four successive steps. First, a list of relevant keywords was created to conduct literature searches (Table 1). The search strategy was optimized with the help of a medical librarian. Our population of interest consisted of registered nurses working in a variety of settings (e.g. acute care hospitals, home care, long term care) (Table 1). All synonyms of omitted nursing care identified in the primary studies and literature reviews on the determinants and outcomes of this phenomenon were included (Griffiths et al., 2018; Papastavrou et al., 2014a,b; Recio-Saucedo et al., 2018) (Table 1). Furthermore, additional key words included frequently used terms for describing the determinants of omitted nursing care such as nurse staffing (e.g., nurse-to-patient ratios) or work environment characteristics. Outcomes included all nurse sensitive outcomes identified by the National Quality Forum (NQF, 2004), or used in primary studies and systematic reviews of omitted nursing care (Griffiths et al., 2018; Papastavrou et al., 2014a,b; Recio-Saucedo et al., 2018). MeSH were used to expand the search.

Second, the first author searched four electronic databases, using various combinations of the keywords listed in Table 1, to identify studies examining the determinants and/or outcomes of omitted nursing care: 1) Medline (Ebsco), 2) CINAHL (Ebsco), 3) Health Management Database (ProQuest), and 4) Cochrane Library. The initial search of the literature was performed between August and October 2018 and was last updated in January 2019. Third, after screening the titles and abstracts, two of the authors read the full manuscript of every article remaining from the original screening. Discrepancies were resolved by the input of the third author. Studies were included if they: a) pertained to omitted nursing care [or its synonyms]; b) examined its determinants or outcomes; c) were published in a peer-reviewed journal, d) were written in English or French, and d) were published between 2001 and 2019. We selected 2001 as the starting point as it corresponds to the year during which the landmark study on *care left undone* was published (Aiken et al., 2001). Last, the reference lists of the included studies were searched to identify any additional relevant studies. We also searched the selected electronic databases, along with Google Scholar, to identify any prior or subsequent studies published by the authors of the retrieved articles that could also meet our inclusion criteria (Fig. 1).

2.3. Data extraction

Data extraction was carried using a standardized protocol. Extracted data consisted of: i) authors and year of publication, ii) design and instruments, iii) countries, iv) sample size, settings, and sampling strategy, v) concepts used characterize omitted nursing care (e.g. care left undone, implicit rationing of nursing care, missed care, and priority setting), and vi) conceptual and methodological challenges reported, if any.

2.4. Data analysis

The analysis of the articles included in this narrative review followed two sequential steps: 1) the description of the characteristics of the included studies, and 2) a thematic analysis following Braun and Clarke's (2006) method. Themes were identified based on their frequency of occurrence in the included manuscripts and agreed upon by members of the research team.

3. Results

The comprehensive search of the literature yielded 5214 citations. After removing duplicates and meticulously screening the titles and abstracts of each retrieved articles, 52 primary studies and 7 literature reviews met our inclusion criteria.

3.1. Characteristics of the primary studies

Of the primary studies included, 90.0% ($n = 47$), were based on cross-sectional designs. Descriptive qualitative (5.8%, $n = 3$), grounded theory (1.9%, $n = 1$), and quasi-experimental (1.9%, $n = 1$) designs were rarely used, and no longitudinal study could be identified. Over half of the studies were conducted in North America

Table 1
Keywords used in literature search.

Population		Interventions		Additional keywords		Outcomes
Nurs*	**AND**	Left undone	**AND**	Caseload	**AND**	Bedsore*
Registered nurse*		Miss*		Education*		Bed-sore*
RN*		Omit*		Education mix		Bed*sore
		Omission		Experience*		Bloodstream infection*
		Prioritiz*		Float nurse		Cardiac arrest*
		Ration*		Hospital manpower		Catheter-associated urinary tract infection*
		Unfinish*		Load*		Central line associated bloodstream infection*
		Unmet		Nurs* hours per patient day		Cross infection*
				NHPPD		Error*
				Nurs* practice environment		Failure to rescue
				"Nurse-to-patient ratio"		Fall*
				NPR		Fall with injur*
				Nurs* manpower		FTR
				Nurs* staffing		Healthcare error*
				Nurs* shortage		Heart failure*
				Overtime		Hospital-acquired pneumonia*
				"Patient-to-nurse ratio"		Incident*
				Personnel staffing		Mistake*
				Personnel scheduling		Medication error*
				Proportion of RN-BSN		Mortality
				Ratio		Nurs* sensitive outcome*
				Resource allocation		Patient outcome*
				Skill*		Pneumonia*
				Skill mix		Pressure ulcer*
				Staffing		Respiratory failure*
				Task		Restrain*
				Workload		Safe*
				Work climate		Shock*
				Work environment		Surgical bleeding
				Workforce		Survival
						Unplanned extubation*
						Urinary tract infection*
						Ventilator acquired pneumonia*
						VAP
						Adverse event*

(51.9%, $n = 27$) and close to a quarter were conducted in Europe (30.7%, $n = 16$). The remainder were carried in the Australasian continent (5.7%, $n = 3$), Middle East (5.7%, $n = 3$) or Asia (5.7%, $n = 3$). Four primary concepts were used in these studies to describe omitted nursing care: 1) missed care (42.3%, $n = 22$), 2) care left undone (34.6%, $n = 18$), 3) implicit rationing of nursing care (19.2%, $n = 10$), and 4) priority setting (3.8%, $n = 2$). These concepts were most commonly measured using self-reported survey instruments (92.3%, $n = 48$), while semi structured interviews or focus groups were used in the other four studies. The most frequently used surveys were the MISSCARE (36.5%, $n = 19$), Tasks undone (TU) (34.6%, $n = 18$), and Basel Extent of Rationing of Nursing Care (BERNCA) (13.4%, $n = 7$) (Table 2). Study samples were mostly recruited using convenience sampling (65.4%, $n = 34$), consisted of a median number of 1338 nurses (range: 169 to 33,659 registered nurses) from a median number of 10 hospitals (range: 1–488 hospitals) (Table 2).

Over a third of the included manuscripts (38%, $n = 20$) were secondary or sub-analyses of larger datasets assembled by national or international research groups (i.e. RN4CAST, RICH, Multistate Nursing Care and Patient Safety Survey, International Hospital Outcome Study, National Database of Nursing Quality Indicators) (Aiken et al., 2001, 2013; Carthon et al., 2015; Kalisch et al., 2011a; Schubert et al., 2008; Park et al., 2018). Consequently, many of these studies tended to remain clustered around four key primary concepts (i.e., care left undone, implicit rationing of nursing care, missed care and priority setting), and studies within a given cluster relied on highly similar research approaches (Fig. 1).

3.2. Characteristics of the literature and systematic reviews

Four literature reviews and three systematic reviews were identified. Most of these reviews were published between 2014 and 2018 ($n = 6$). The median number of primary studies included in these reviews was 18 (range: 14–88 studies) (Table 3).

3.3. Conceptual and methodological challenges

Thematic analysis of the conceptual and methodological challenges retrieved from primary studies and literature reviews revealed six themes, which we report in descending order of occurrence, the: 1) use of self-reported measures; 2) use of cross-sectional designs; 3) multidimensional nature of omitted nursing care; 4) interdisciplinary and collaborative nature of health care; 5) content validity of existing instruments, and; 6) multiplicity of conceptual definitions of the phenomenon.

First, the most frequently reported challenge in this body of research was methodological in nature. This corresponds to the heavy reliance on self-reported instruments for measuring, from the perspective of registered nurses, the determinants (e.g., nurse-to-patient ratios, work environment characteristics), and the extent of omitted nursing care. In some cases, the occurrence of patient outcomes was also self-reported (Duffy et al., 2018; Lake et al., 2018; Lucero et al., 2010; Schubert et al., 2008; Smith et al., 2018). Given that registered nurses report on the independent, dependent and mediator variables, this approach is highly vulnerable to several bias (e.g., response, recall, circularity). To partially address this challenge, multiple researchers have relied on administrative data to extract objective measures of nurse staffing (e.g., nursing hours per patient per day) and patient outcomes (Castner et al., 2015; Dabney and Kalisch 2015; Kalisch et al., 2011a,b, 2012b; Schubert et al., 2012).

Second, the majority of existing studies relied on hospital-level cross-sectional designs for examining the determinants and outcomes of omitted nursing care. Such designs do not allow for causal inferences because omitted care, along with its

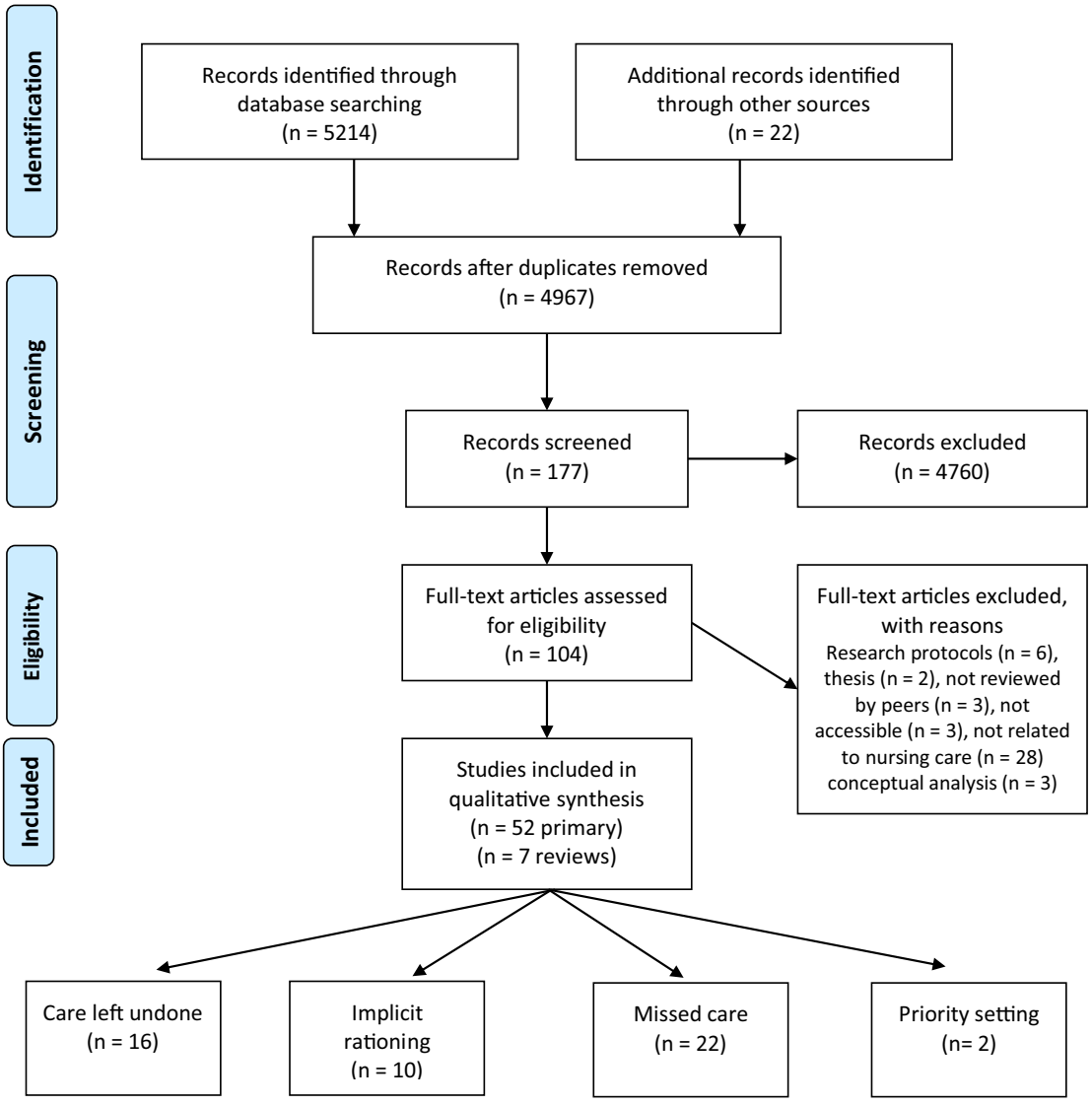

Fig. 1. Flow diagram of study inclusion based on PRISMA (Moher et al., 2009).

determinants and presumed outcomes, is measured at the same point in time (Ausserhofer et al., 2014; Friese et al., 2013; Rochefort and Clarke, 2010). While more robust studies are required to strengthen the existing body of evidence and address this methodological challenge, there currently exist no method, and no data source, to efficiently capture what registered nurses omit (or not) at the bedside on a daily and a shift-by-shift basis.

Third, several researchers have reported that omitted nursing care is a multidimensional concept; therefore highlighting that multiple heterogeneous aspects of care can be omitted (e.g., patient surveillance, teaching, comfort care, discharge planning). Interestingly, most researchers have thus far relied on the "composite" approach to measure omitted nursing care, and to estimate its effects on outcomes (Jones et al., 2015). In this approach, an overall mean score is used to reflect the extent to which a collection of heterogeneous nursing care elements is omitted over a given period (Jones et al., 2015). Given that equivalent composite scores could result from the omission of very distinct care elements (e.g. basic nursing care such as mobilization or hygiene, versus care planning and coordination), this measurement approach has the potential to either underestimate or overestimate the true impact of the omitted nursing care on outcomes or result in misleading inferences. To address this other methodological challenge, the "multidimensional" approach could be used, which aims to measure the extent to which selected categories of similar care elements are omitted. The most common categories reported across the literature being: a) patient surveillance and monitoring, b) education and teaching; c) care planning and coordination, d) symptom management and comfort care, e) basic care (i.e. ambulation, hygiene), f) surveillance and assessment, g) medical treatments and interventions, and; h) nurse-initiated independent interventions. Given that previous studies have suggested that not all categories of nursing care are omitted at the same frequency or to the same extent, the multidimensional approach might provide the most interesting and useful insights.

Forth, since the provision of healthcare is a team effort by several health care providers, and given that professional jurisdictions in some countries overlap to some extent, what a registered nurse self-perceives as "omitted" might have been provided by other members of the nursing staff (e.g., other registered nurses, nursing assistants, patient care attendants), by other professionals (e.g., physicians, respiratory therapists, social workers, physiotherapists)

Table 2
Characteristics of the primary studies.

Authors, year or publication	Design	Instruments	Countries	a) sample b) settings c) sampling	Core concept	Conceptual and methodological challenges
Aiken et al. (2013)	Cross- sectional	PES-NWI TU-13 RN reported outcomes	12 European countries	a) 33 659 RNs b) 488 hospitals c) variable	Care left undone	NR
Al-Kandari and Thomas (2009)	Cross-sectional	RN reported staffing TU-9	Kuwait	a) 780 RNs b) medical and surgical wards, 5 hospitals c) convenience	Care left undone	1. Self-administered surveys 2. Non nursing tasks completed by nurses influence care left undone 3. There is a cognitive, human aspect of taking care, which influences care delivery.
Ausserhofer et al. (2014)	Cross- sectional	PES-NWI RN reported staffing TU-13	12 European countries	a) 33 659 RNs b) 488 hospitals c) random units, convenience	Care left undone	1. Cross-sectional, absence of causality 2. Self-administered surveys 3. Social desirability, cultural factors influence response patterns 4. Large variability within country 5. Care left undone might be different than the 13 selected in the survey.
Backnick et al. (2018)	Secondary analysis, cross-sectional	PES-NWI BERNCA GS-PEQ	Switzerland	a) 1810 RNs, 2073 patients b) 132 units, 35 hospitals c) quota units sampling, convenience	Rationing	1. Cross-sectional, no causality 2. Patients could have been influenced by nurses while completing surveys
Ball et al. (2013)	Cross- sectional	PES-28 RN reported staffing TU-13 QOC-1	England	a) 2 917 RNs b) 401 medical surgical units, 46 hospitals c) random stratified	Care left undone	1. Surveillance is a care frequently left undone and a mechanism in the association between staffing and mortality 2. Some activities provided by other care givers 3. Cross-sectional, absence of causality 4. Self-reported measures, influenced by understanding
Ball et al. (2016)	Cross- sectional	PES-NWI RN reported staffing TU-13	Sweden	a) 10 174 RNs b) 79 hospitals, medical-surgical c) purposive	Care left undone	1. Considerable variability in care left undone between shifts 2. The scope of practice and amount of “transferable” care influence care left undone 3. Staffing influences the occurrence of missed care 4. Cross-sectional, absence of causality 5. Care identified as left undone might have been provided by other staff
Ball et al. (2018)	Secondary analysis, cross-sectional	RN reported staffing, % BSN TU-13	9 European countries	a) 26 516 RNs, 422 730 surgical patients b) 300 hospitals c) convenience	Care left undone	1. Missed care mediates the association between staffing and mortality 2. BSN education is an important determinant of in hospital mortality 3. Missed care is a multidimensional construct 4. Self-reported measures 5. Cross-sectional, absence of causality
Bittner and Gravlin (2009)	Qualitative descriptive	Focus groups	USA	a) 27 RNs b) medical-surgical unit of 1 hospital c) convenience	Prioritization	1. Delegation influences care delivery, patient and nurse outcomes
Blackman et al. (2014)	Cross- sectional	MISSCARE	Australia	a) 289 RNs b) Professional organizations c) convenience	Missed care	1. Results only valid in the context of the study’s sample. 2. Exploring why nursing care is missed rather than missed care is a promising path. 3. Missed care is a multidimensional concept.

(*Continued on next page*)

Table 2 (*Continued*).

Authors, year or publication	Design	Instruments	Countries	a) sample b) settings c) sampling	Core concept	Conceptual and methodological challenges
Blackman et al. (2018)	Secondary analysis, cross-sectional	MISSCARE	Australia, Italy, Cyprus	a) 1 896 RNs b) ANMF, 12 hospitals. c) convenience	Missed care	1. Geographic variations in patterns of missed care 2. Families compensate missed care 3. The scope of practice of RNs varies 4. Prioritization of care might be influenced by the education received by nurses 5. Culture influences missed care reporting and patterns 6. Cross-sectional, absence of causality
Bloomer et al. (2017)	Cross- sectional	Homemade survey	Australia	a) 359 RNs b) Australian College of Critical Care Nurses c) convenience	Prioritization	1. The type and formulation of items might have introduced measurement and respondent bias
Bruyneel et al. (2015)	Secondary analysis, cross-sectional	PES-NWI, RN reported staffing TU-13 Patient experience	8 European countries	a) 10 733 RNs, 11 549 patients b) 217 hospitals c) convenience	Care left undone	1. Nurse education is not equivalent between individuals and organizations 2. Nurse education interacts with nurse staffing levels 3. Cross-sectional, absence of causality 4. Nurses well-being should be included as an exploratory variable 5. The effect of shift type and shift length should be assessed
Carthon et al. (2015)	Cross- sectional	PES-NWI, RN reported staffing TU-10 Discharge diagnosis	USA	a) 160 930 HF readmissions, 20 605 RNs b) 419 hospitals c) convenience	Care left undone	1. The work environment is a determinant of missed care 2. Considerable between setting variation in missed care prevalence 3. Cross-sectional, absence of causality 4. Some aspects of nursing care are not captured by the surveys
Castner et al. (2015)	Cross- sectional	Administrative data (staffing) MISSCARE Incident reports, RN reported events	USA	a) 553 RNs b) 2 hospitals c) convenience sampling	Missed care	1. Mixed models might better explain the effect of experience on missed care 2. Cross-sectional, absence of causality 3. Surveys might introduce measurement errors 4. Workload, patient acuity, varies within shifts and requires flexibility.
Cho et al. (2015)	Cross- sectional	MISSCARE	Korea	a) 232 RNs b) 1 hospital (4 high-staff units, 9 low staff units) c) convenience	Missed care	1. Some care is rarely missed 2. Nursing teamwork hard to assess 3. Care not provided by RNs might have been provided by families
Cho et al. (2016)	Cross- sectional	PES, RN reported staffing TU-13 QOC-1	Korea	a) 3 037 RNs b) random stratified sample of hospitals (51), random sample units c) convenience	Care left undone	1. Cross-sectional, absence of causality 2. Self-reported measures 3. Work environment influences outcomes 4. Care left undone is multidimensional
Dabney and Kalisch (2015)	Secondary analysis, cross- sectional	Administrative data (staffing) MISSCARE-patient version	USA	a) 729 patients b) 12 medical, 6 surgical, 2 rehabilitation units, 2 hospitals d) convenience	Missed care	1. Delegation of care influences care delivery. 2. Teamwork is a determinant of missed care 3. Social desirability influences patient reports
Dhaini et al. (2017)	Secondary analysis, Cross-sectional	PES-NWI BERNCA-nursing home Swiss Health Survey items MBI item Presenteeism item	Switzerland	a) 3239 workers, 910 RNs b) 162 nursing homes c) random units, convenience	Rationing	1. Work-related illness might influence the ability of nurses to carry tasks 2. Self-reported measures

(*Continued on next page*)

Table 2 (*Continued*).

Authors, year or publication	Design	Instruments	Countries	a) sample b) settings c) sampling	Core concept	Conceptual and methodological challenges
Duffy et al. (2018)	Cross- sectional	PES-NWI MISSCARE	USA	a) 187 RNs b) 17 units and ER, 1 hospital c) Stratified random	Missed care	1. Missed care is a "normalized" phenomenon 2. Missed care is multidimensional 3. A large proportion of the variance in missed care remains unknown
Friese et al. (2013)	Secondary analysis, cross-sectional	MISSCARE	USA	a) 2 318 nursing personnel b) 62 units (12 oncology, 50 non-oncology), 9 hospitals c) convenience	Missed care	1. Self-reported missed care 2. Cross-sectional assessment of missed care does not capture missed care in a specific time frame
Gravlin and Bittner (2010)	Cross- sectional	RN reported staffing MISSCARE Delegation questionnaire	USA	a) 241 RNs, 99 NAs b) 16 medical-surgical units, 3 hospitals c) convenience	Missed Care	1. Self-reported data 2. Surveys might not provide a full description of missed care
Griffiths et al. (2014)	Cross- sectional	RN reported staffing TU-13 QOC-1	12 European countries	a) 31 627 RNs b) 488 hospitals c) variable	Care left undone	1. Cross-sectional, absence of causality 2. Nurse-reported outcomes
Hessels et al. (2015)	Secondary analysis, cross-sectional	PES-NWI, RN reported staffing TU-12	USA	a) 7 679 RNs b) 70 acute care hospitals c) 50% random	Care left undone	1. Work environment influences missed care 2. Cross-sectional, absence of causality, more robust designs are required
Jones (2015)	Cross- sectional	EOMII PIRNCA QOC-1	USA	a) 94 RNs, 63 NAs, 69 NMs b) 11 Texas Health and Human Services Regions c) stratified random	Rationing	1. Non-response bias in rationing surveys 2. Regional variations in the scope of practice of RNs 3. Care is provided by multiple RNs, who ration multiple care activities 4. Cumulative frequency of rationing might be more precise 5. Rationing might be influenced by unconscious mechanisms
Kalisch and Lee (2010)	Cross- sectional	RN reported staffing MISSCARE Nursing teamwork survey	USA	a) 2 216 nursing staff b) 50 mixed units, 4 hospitals c) convenience	Missed care	1. Care is provided by multiple team members, therefore teamwork is important
Kalisch et al. (2011a)	Cross- sectional	Administrative data (staffing) MISSCARE	USA	a) 4288 nursing staff members b) 110 units, 10 hospitals c) convenience	Missed care	1. HPPD is an important determinant of missed care, because less staff leads to less care because they are unavailable to help. 2. Perception of missed care is subjective 3. Self-reported measures
Kalisch et al. (2011b)	Secondary analysis, cross- sectional	Administrative data (staffing) MISSCARE	USA	a) 3 135 RNs, 939 NAs b) 110 adult units, 10 hospitals c) convenience	Missed care	1. Self-reported measures 2. Objective measures of missed care are vulnerable to other measurement bias
Kalisch et al. (2011c)	Secondary analysis, cross- sectional	MISSCARE	USA	a) 3 143 RNs, 943 NAs b) medical-surgical, intensive care, stepdown, rehabilitation units, 10 hospitals c) convenience	Missed Care	1. Self-administered surveys 2. Direct observation might provide a more accurate measure but is vulnerable to observer bias
Kalisch et al. (2012a)	Grounded exploratory qualitative	Focus groups	USA	a) 10 groups of 6–12 RNs (5 high staff, 5 low staff units) b) 10 hospitals c) convenience	Missed care	1. Teamwork is a key determinant of missed care 2. Structural characteristics of organizations influences missed care 3. Staffing does not overcome the problem of missed care alone
Kalisch et al. (2012b)	Cross- sectional	Administrative data (staffing) MISSCARE Fall rates	USA	a) 3432 RNs b) 11 hospitals c) convenience	Missed Care	1. Mindfulness of staff is an important factor in improving outcomes 2. Measures of missed care is related to the perception of staff

(*Continued on next page*)

Table 2 (*Continued*).

Authors, year or publication	Design	Instruments	Countries	a) sample b) settings c) sampling	Core concept	Conceptual and methodological challenges
Kalisch et al. (2013a)	Cross- sectional	RN reported staffing MISSCARE	USA + Lebanon	a) 633 RNs US, 114 RNs Lebanon b) 1 hospital in each country c) convenience	Missed care	1. Families provide care, which is not taken into consideration 2. Social desirability might influence missed care reporting 3. Cultural differences might influence reporting
Kalisch et al. (2013b)	Repeated measures	MISSCARE Nursing teamwork survey	USA	a) 242 nursing staff members b) 3 medical surgical units, 3 hospitals c) convenience	Missed care	1. Self-administered measures are based on perceptions
Lake et al. (2018)	Secondary analysis, cross-sectional	PES-NWI, AHA survey TU-13	USA	a) 1 037 RNs b) 134 NICUs, 134 hospitals c) random sampling	Care left undone	1. Cross-sectional, no causality 2. Most research focussed on aggregate measures
Liu et al. (2018)	Secondary analysis, cross-sectional	PES-NWI Nurse workload TU-12 MBI RN reported outcomes	China	a) 1542 RNs b) 111 medical surgical units, 23 hospitals c) random units, convenience	Care left undone	1. Cross-sectional, no causality 2. All variables are from nurses report 3. Study variables and their measures have different time references
Lucero et al. (2009)	Secondary analysis, cross-sectional	PES-NWI TU-7	USA	a) 10 184 RNs b) 168 hospitals c) 50% random sample of RNs, Pennsylvania State Board of Nursing	Unmet nursing care needs	1. Hospital level measure of unmet nursing needs (unit-level data is preferable) 2. The process of care should be further investigated 3. Behavioral and cognitive have an impact on unmet nursing care needs
Lucero et al. (2010)	Secondary analysis, cross-sectional	PES-NWI, patient characteristics TU-7 RN reported outcomes	USA	a) 10 184 RNs b) 168 hospitals c) 50% random sample of RNs, Pennsylvania State Board of Nursing	Unmet nursing care needs	1. Same-source bias (self-reported unmet nursing care needs and adverse events) 2. Unmet nursing care needs might not represent the actual quality of care (7 care activities)
Nelson and Flynn (2015)	Secondary analysis, cross-sectional	IWPS TU-12 Urinary tract infections	USA	a) 340 RNs b) 63 nursing homes c) 50% random sample New Jersey	Care left undone	1. Care activities influencing the selected outcome might be different than the ones in the survey 2. Self-reported measures and social desirability
Orique et al. (2015)	Cross- sectional	MISSCARE	USA	a) 169 nursing staff b) 1 hospital c) convenience	Missed Care	1. Missed care is based on the perception of care being missed by RNs
Palese et al. (2015)	Cross- sectional	3 months Daily observations (staffing) MISSCARE	Italy	a) 205 RNs, 109 NAs b) 12 medical units, 12 hospitals c) convenience	Missed care	1. Families provide some of the care, yet there are cultural differences. 2. Skill mix is an important determinant of missed care; cared being provided by multiple professionals 3. Social desirability might influence reporting of missed care 4. Self-administered measures
Papastavrou et al. (2014b)	Descriptive qualitative	Focus groups	Cyprus	a) 23 RNs b) 3 hospitals c) purposive	Rationing	1. Environmental factors, caregiver's culture and ethos influence rationing 2. Priorities are influenced by the biomedical model 3. Individual attitudes and factors influence prioritization and rationing of care
Park et al. (2018)	Secondary analysis, cross-sectional	PES-NWI 15 "missed care activities"	USA	a) 31 650 RNs b) 1 583 medical surgical units, 371 hospitals c) convenience	Missed Care	1. Processes of care are hard to capture 2. Missed care might be a mediator in structure-outcome relationships 3. Some care activities might be deprived and not measured 4. Self-reported measures might introduce response bias
Rochefort and Clarke (2010)	Cross- sectional	NWI-R NEWRI, Emotional Exhaustion scale, MBI QOC-1	Canada	a) 339 RNs b) 9 NICUs, 9 hospitals c) convenience	Rationing	1. Subjective measures 2. Cross-sectional design, no causality 3. Multiple unknown factors could influence outcomes

(*Continued on next page*)

Table 2 (*Continued*).

Authors, year or publication	Design	Instruments	Countries	a) sample b) settings c) sampling	Core concept	Conceptual and methodological challenges
Schubert et al. (2008)	Secondary analysis, cross- sectional	NWI-R, RN reported staffing BERNCA QOC-1 RN reported outcomes (5) Patient satisfaction	Switzerland	a) 2 052 RNs b) 60 surgical, 51 medical and 8 gynecological units, 8 hospitals c) convenience	Rationing	1. NPR is one of many determinants of nurses' workload 2. Important to determine the rationing threshold that affects patient outcomes 3. Cross-sectional design, no causality 4. Nurses reported outcomes
Schubert et al. (2009)	Secondary analysis, cross-sectional	NWI-R, RN reported staffing BERNCA QOC-1 RN reported outcomes (5) Patient satisfaction	Switzerland	a) 1 338 RNs, 779 patients b) 118 units, 8 hospitals c) convenience	Rationing	1. Nurse reported outcomes might be less accurate 2. Different time frames for reported rationing and outcomes 3. Experimentation is unlikely given the importance and nature of nursing care
Schubert et al. (2012)	Secondary analysis, cross- sectional	NWI-R, RN reported staffing BERNCA Discharge diagnosis	Switzerland	a) 165 862 discharges survey, 1 338 RNs compared to 760 608 discharges from other hospitals b) 8 survey, 71 comparison hospitals c) convenience	Rationing	1. Cross-sectional studies, no causality 2. The quality of discharge data might vary between hospitals
Schubert et al. (2013)	Secondary analysis, cross-sectional	PES-NWI-R, BERNCA-R	Switzerland	a) 1 633 RNs b) quota sample of 35 hospitals, medical surgical units c) convenience	Rationing	1. The hierarchical system of care rationing needs to be investigated 2. Nurse reported staffing levels 3. Cross-sectional, no causality
Smith et al. (2018)	Cross- sectional	PES-NWI, CEBS MISSCARE	USA	a) 233 RNs b) 5 hospitals c) convenience	Missed care	1. Structural factors influence missed cared 2. Perception of the work environment influences missed care 3. Work group effectiveness influences missed care 4. Cross-sectional design, no causality
Sochalski (2004)	Cross- sectional	TU-7 QOC-1, Patient safety problems	USA	a) 8 670 RNs b) Licensed RNs of Pennsylvania, medical, surgery, intensive care. c) 50% random simple	Tasks left undone	1. Work environment has an important effect on tasks left undone 2. Cross sectional, no causality 3. Self-reports, vulnerable to respondent bias
Srulovici and Drach-Zahavy (2017)	Cross- sectional	Accountability surveys, RN reported complexity MISSCARE	Israel	a) 172 focal and 123 incoming RNs b) 32 units, 8 hospitals c) snowball sampling	Missed care	1. Personal accountability "shapes" missed care 2. Ward accountability interacts with personal accountability 3. Self-reported measures 4. Cross-sectional, no causality
Thomas-Hawkins et al. (2008)	Cross- sectional	RN reported staffing TU-7 Nurse reported outcomes (13)	USA	a) 1 015 RNs b) hemodialysis, American Nephrology Nurses' Association c) random	Care left undone	1. Underlying mechanisms between staffing and outcomes unclear 2. Measures of care left undone do not include all given care 3. Structures, processes of care and work environments influence tasks and outcomes
Winters and Neville (2012)	Descriptive qualitative	Semi-structured interviews	New Zealand	a) 5 RNs b) not reported c) purposive	Missed care	1. Emotional wellbeing influences missed care 2. Delegation influences delivery of care
Zuniga et al. (2015)	Cross-sectional	Staffing PES-NWI BERNCA SAQ HPSI	Switzerland	a) 4307 respondents, 1078 RNs b) 402 units, 163 nursing homes c) representative sampling of nursing homes, convenience	Rationing	1. Subjective measure of nursing care rationing 2. Social desirability in reporting rationed care 3. Cross-sectional, no causality

AHA: American Heart Association; ANMF: Australian Nursing & Midwifery Federation; BERNCA: Basel Extent of Rationing of Nursing Care; BERNCA-R: BERNCA revised; CEBS: Collective Efficacy Beliefs Scale; %BSN: % of bachelor prepared nurses; EOMII: Essentials of Magnetism II; GS-PEQ: Generic Short Patient Experiences Questionnaire; HF: heart failure; HPSI: Health Professions Stress Inventory; NAs: Nursing assistants; NEWRI: Neonatal Extent of Work Rationing Instrument; NICUs: neonatal intensive care units; NMs: nurse managers; NWI: Nurse Work Index; NWI-R: Nurse Work Index Revised; IWPS: Individual Workload Perception Survey; PES: Practice Environment Scale; PES-NWI: Practice Environment Scale of the Nurse Work Index; PIRNCA: perceived implicit rationing of nursing care; QOC-1: quality of care item; RN: registered nurse; SAQ: Safety Attitudes Questionnaire; TU: Tasks-undone; USA: United States of America.

Table 3
Characteristics of the reviews.

Authors, year of publication	Design	Aim	Number of studies, sample sizes	Conceptual and methodological challenges
Hendry and Walker (2004)	Literature review	Priority setting in nursing and influencing factors	a) NR b) NR	1. Experience is central to effective decision-making
Kalisch and Xie (2014)	Comprehensive review of missed care findings	Nurse staffing and missed care	a) NR b) NR	1. Staffing thresholds need to be investigated 2. The impact of missed care on cost should be investigated 3. Technologies might help reduce missed care
Papastavrou et al. (2014a,b)	Systematic review	Factors and processes of care rationing	a) 17 studies b) 104–10,184 RNs 779–165,862 patients	1. Philosophy of care might influence care rationing patterns 2. Care is influenced by the dominating biomedical ethos
Jones et al. (2015)	Literature review	Unfinished care concepts, prevalence and outcomes	a) 54 studies b) 5–33,659 RNs 38–729 patients	1. Differences in conceptualization of unfinished care 2. Surveys can be affected by recall, respondent and social desirability bias 3. Self-reported measures might under or overestimate reports 4. Some care is relevant to multiple items (ex. surveillance), which may influence the composite scores
Griffiths et al. (2018)	Systematic review	Nurse staffing and missed care	a) 18 studies b) 232–31,627 RNs	1. Subjective measures of missed care 2. Intermittent surveys 3. Large variability in measures and analysis 4. Causality cannot be ascertained with cross-sectional designs
Harvey et al. (2018)	Institutional ethnography, based on literature review	Work intensification and capacity to complete care	a) 88 studies b) NR	1. Cost constrained environments influence care completion
Recio-Saucedo et al. (2018)	Literature review	Unfinished care and patient outcomes	a) 14 studies b) 318–39,292 RNs 352–760,608 patients	1. Studies conducted in different settings (e.g. acute care, nursing homes) 2. Self-reported measures are vulnerable to bias

RNs: registered nurses; NR: not reported.

Table 4
Concepts used to refer to omitted nursing care.

Primary concept	Authors, date	Definition or first report of the concept	Secondary concepts or indicators
Care left undone	Aiken et al. (2001)	"a number of tasks that are markers of good nursing care [...], were frequently reported as left undone"	Unfinished care[a], Nursing task incompletion[b], Unmet nursing care needs[c]
Priority setting	Hendry and Walker (2004)	"involves the ordering of nursing problems, using notions of urgency and/or importance, in order to establish a preferential order for nursing actions"	Prioritization[d]
Implicit rationing of nursing care	Schubert al. (2008)	"the withholding or failure to carry out necessary nursing tasks due to inadequate time, staffing level/or skill mix"	Failure to maintain[e], Perceived Implicit Rationing of Nursing care[f]
Missed care	Kalisch et al. (2009)	"any aspect of required patient care that is omitted (either in part or in whole) or delayed"	N/A

[a] Sochalski (2004).
[b] Al-Kandari and Thomas (2009).
[c] Lucero et al. (2009).
[d] Bloomer et al. (2017).
[e] Bail and Grealish (2016).
[f] Jones (2014); N/A: not applicable.

or by family members. This methodological challenge is typically addressed, at least in part, in the context of cross-sectional studies by aggregating registered nurses' self-reported scores at the nursing unit or hospital level of analysis (Aiken et al., 2013; Ausserhofer et al., 2014). However, there currently exists no agreed upon methods for addressing this challenge in the context of longitudinal studies conducted at the patient level of analysis nor for efficiently capturing care activities performed by other professionals and families.

Fifth, most existing instruments for measuring omitted nursing care have been developed and validated for specific settings or as "generic" instruments that can be used across a variety of settings. As such, they include generic nursing care processes that are common to many settings. While this approach is useful for benchmarking and meta-analytical efforts, it also has an important drawback. There are many settings (e.g. intensive care units) in which specific nursing care processes (e.g. monitoring of temporary epicardial pacing) might be highly relevant for patient safety and outcomes, but these are simply not listed among the items of a given generic instrument.

Last, four main concepts and multiple secondary concepts have appeared in the literature over the past two decades to describe the phenomenon of omitted nursing care and, for each of them, several related sub-concepts have been proposed (Table 4). As noted by Jones et al. (2015), the differences are more in the terminology employed rather than in the substance. Moreover, the authors who introduced these concepts have proposed very similar mechanisms of action or conceptual frameworks for explaining the associations between the determinants and outcomes of omitted nursing care (Jones et al., 2015; Papastavrou et al., 2014a). Nonetheless, the multiplicity of concepts and definitions is an important conceptual challenge that portrays this body of

evidence as fragmented around schools of thought. Challenges are further detailed in Tables 2 and 3.

4. Discussion

The objectives of this narrative review were to synthesize the conceptual and methodological challenges of the studies examining the determinants and outcomes of omitted nursing care, and to identify avenues for further research. After reviewing both primary and secondary studies, we identified six challenges that characterize this body of evidence. The discussion is organized around these challenges.

4.1. The use of self-reported measures

We found that most studies measured omitted nursing care using registered nurses' self-report. Moreover, in many of these investigations, the determinants of omitted care (and sometimes its presumed outcomes) were also measured from the same respondents (i.e. registered nurses). Self-administered surveys are well known to be vulnerable to many biases such as recall, social desirability and measurement bias (Jones et al., 2015). For this reason, our current understanding of omitted nursing care, its determinants and outcomes, might be considerably different from reality.

While objective measures have been validated for capturing staffing and outcomes (Rochefort et al., 2015; Van den Heede et al., 2007), there is currently few objective, valid and efficient measures of omitted nursing care (Jones et al., 2015; VanFosson et al., 2016). Direct observation is time-consuming, costly and is vulnerable to observer bias and halo effects (Kalisch et al., 2011c). Chart review is also labor-intensive, expensive (Rochefort et al., 2015), and nurses are well-known for poorly documenting several aspects of patient care (Dimond, 2005; Prideaux, 2011). Electronic health records have been implemented in several countries, and Belgium is currently leading the development of electronic documentation and reporting systems for nursing care (De Clercq, 2008; Shiells et al., 2018). With the increasing availability of natural language processing techniques, it is possible that such systems will allow for more efficient and accurate measurement of omitted nursing care. These systems might also provide a means for capturing care activities provided by the interprofessional team, therefore addressing another of the methodological challenges we identified.

4.2. The use of cross-sectional designs

We found that studies examining the determinants and outcomes of omitted nursing care are mostly based on cross-sectional designs, which limits causal inferences (Friese et al., 2013). Moreover, hospital-level data imprecisely allocates omitted nursing care and its determinants to a given patient, which also limits the validity of existing evidence (Griffiths et al., 2018). To bring the field forward and generate more robust evidence, many have called for longitudinal studies (Audet et al., 2018; Rochefort and Clarke, 2010). While there currently exists methods for capturing day-to-day and shift-to-shift variations in nurse staffing and other determinants of omitted care, there are presently no valid and efficient method for capturing daily variations in the extent to which various aspects of nursing care are omitted. Asking registered nurses to self-report daily on whether they performed selected nursing care activities or not would greatly add to their work burden in already time-constrained environments. For this reason, registered nurses working at the bedside must be involved in the search for novel and potentially better methods for measuring omitted nursing care, and in assessing their feasibility and acceptability. As for the previous challenge, it is possible that electronic health records and nursing documentation systems may provide new opportunities for measuring omitted care (Ball et al., 2018). This approach may prove acceptable to registered nurses if it has little or no impacts on their workload. However, its feasibility across many health care settings remains to be demonstrated (e.g., availability of electronic health records, nursing documentation systems and technical resources to extract data).

4.3. The multidimensional nature of omitted nursing care

We also found that omitted nursing care is commonly defined as a multidimensional concept (Ball et al., 2018; Blackman et al., 2014), but that most researchers operationalized it using the "composite score approach". However, existing evidence suggests that not all care elements may be omitted at the same frequency or to the same extent (Bruyneel et al., 2015; Orique et al., 2015; Winters and Neville, 2012). For example, the provision of medical treatments and interventions is often reported as being less frequently omitted then the delivery of basic nursing care (e.g., bathing, mouth care) or symptom management (Ausserhofer et al., 2014; Blackman et al., 2018). Whether the frequency at which registered nurses report omitting certain nursing care activities reflects actual care prioritization or sequencing at the bedside remains to be established. To examine this important research question, and to better elucidate the complex decision-making processes at play, future studies should favor the multidimensional approach for measuring omitted nursing care. Indeed, this approach would allow measuring the independent effect on outcomes of each category of nursing care while accounting for the other categories.

Alternatively, one could target very specific care processes (e.g., assessments of mouth structures, provision of chlorhexidine mouth care) and examine their association with plausible outcomes (e.g. ventilator acquired pneumonia). This theoretically-plausible approach, might help understand how specific nursing care processes influence patient outcomes, and examine causal pathways. To that end, real-time computerized dashboards have been used to capture the compliance of health care professionals with specific care bundles related to the prevention of ventilator associated pneumonias (Harris et al., 2018; Talbot et al., 2015). These systems could also allow researchers to estimate the impact of cumulative care omissions in case-control or longitudinal designs. However, such systems (and the underlying human infrastructure to operate it) may only be available at large academic health centres, which in turn could bias to some extent our understanding of the phenomenon of omitted nursing care.

To circumvent this potential problem, some have proposed that future studies should identify the categories of care that will have the greatest effect on specific patient outcomes (Ball et al., 2018). Omitting care with "less benefits" in order to complete care with "greater benefits", in a time-constrained environment, might be a judicious decision in some contexts (Jones, 2015). However, identifying what are the care activities with the greatest benefits in a given clinical context is a complex task. Indeed, patients, families and healthcare professionals may have very different views on what these care activities are, or even on the benefits to expect (Feo et al., 2018; Harvey et al., 2018). Exploring these potentially different views and identifying what constitutes or not "fundamental" nursing care from the perspective of all involved parties represents an interesting avenues for further research.

4.4. The interdisciplinary and collaborative nature of health care

Current measures of omitted nursing care ask registered nurses to self-report on the care activities they were not able to perform over a given period. There currently exist no methods for capturing whether these care activities were performed by someone else or not (Bittner and Gravlin, 2009; Dabney and Kalisch, 2015).

Indeed, the extent to which tasks that are not specific to registered nurses' scope of practice (e.g. patient teaching, mouth care, ambulation), are provided by other healthcare professionals (e.g., respiratory therapists, physiotherapists) varies between countries and across organizations. As noted by the National Institute for Health Research (2019): "most of the evidence fails to consider the contributions of other health professionals". The contributions of family members and relatives are also rarely accounted for in existing studies. As such, better understanding and accounting for these contributions is an important next step in investigation. To this end, the use of shared interprofessional electronic care plans and standardized communication tools might prove useful in future studies.

4.5. The content validity of existing instruments

Thus far, omitted nursing care has been estimated with generic instruments (e.g. MISSCARE) that were used in a variety of settings. While this approach has made important contributions to the field, it nonetheless entails that the inferences made while using these instruments in specialized units might not be valid. Multiple investigators reported that patients might have been deprived of important nursing care processes that are simply not listed in existing survey instruments (Ausserhofer et al., 2014; Gravlin and Bittner, 2010; Lucero et al., 2010; Park et al., 2018). Because the content validity of benchmark instruments in specialized units (e.g. critical care) has not been thoroughly examined, our understanding of the prevalence and patterns of omitted nursing care might be inaccurate. Thus far, survey instruments have been adapted for pediatric populations (Bagnasco et al., 2018), and a quality indicator (i.e. failure to maintain) proposed for geriatric populations (Bail and Grealish, 2016). It is imperative that future versions of existing instruments for measuring omitted nursing care more accurately reflect the care provided in these settings.

4.6. The multiplicity of concepts for describing omitted nursing care

Last, we found that multiple concepts and definitions have been proposed to define the phenomenon of omitted nursing care. While this can be viewed as a richness of this field, several groups, such as the RANCARE Cost Action Consortium, have advocated for, and are currently working towards greater conceptual/operational clarity and standardization along with more transparent reporting from authors of studies investigating the phenomenon (RANCARE, 2016). Such important work should be encouraged and pursued. As pointed out by the International Learning Collaborative - Fundamentals of Care group, greater conceptual clarity and standardization are important to improve our understanding of the phenomenon, generate a robust body of evidence (Feo et al., 2018; International Learning Collaborative, 2019). Also, we believe that such efforts will support meta-analytical efforts, influence healthcare policies and resource allocation at the bedside

4.7. Strengths and limitations

This narrative review has several strengths and limitations. First, our work builds on and expands recent systematic reviews on the determinants and outcomes of omitted nursing care (Griffiths et al., 2018; Jones et al., 2015, Papastavrou et al., 2014a; Recio-Saucedo et al., 2018) in several important ways: 1) by summarizing the main conceptual and methodological challenges from this field; 2) identifying potential solutions for each of these challenges, and; 3) suggesting avenues for further research. Second, although we used a comprehensive search strategy it is possible, as in any systematic review, that some important studies were missed. For this reason, our work should be updated and expanded periodically. Nonetheless, the six themes that we identified were highly recurrent across the 59 included studies and it is very unlikely that an important theme was missed. Third, we included manuscripts that used sub-samples of larger inquiries. While this approach as the merit of being exhaustive, it may have amplified some of our conclusions to a certain extent. Last, some of the reviewed studies were also characterized by a partial/incomplete exposition of their limitations and challenges. This may have influenced the frequency at which the various challenges identified have been reported in the literature. It is hoped that the ongoing work by the RANCARE consortium (RANCARE, 2016), on the transparent reporting of studies pertaining to omitted nursing care will address this limitation for future studies.

5. Conclusion

Since the identification of omitted nursing care as a mediator of the associations between nurse staffing practices and patient outcomes, multiple studies have been published. These studies have raised several important conceptual and methodological challenges associated with the definition and measure of omitted nursing care. We have summarized these challenges and, for each of them, several potential solutions were proposed along with areas for further research. To strengthen this body of evidence, there is a strong need for patient-level longitudinal studies. Further research is also required to develop and validate more objective measures of omitted nursing care that are perceived as feasible and acceptable by registered nurses at the bedside.

CRediT authorship contribution statement

Christian Vincelette: Conceptualization, Methodology, Writing - original draft, Formal analysis. **Maureen Thivierge-Southidara:** Conceptualization, Methodology, Writing - original draft, Formal analysis. **Christian M. Rochefort:** Conceptualization, Methodology, Formal analysis.

Funding

No funding was received for the completion of this review. CV received a doctoral scholarship from the Faculty of Medicine and Health Sciences at the Université de Sherbrooke and from the Canadian Institutes of Health Research. CR holds a career award from the Canadian Institutes of Health Research. The Canadian Institutes of Health Research were not involved in the decision to conduct this review, in data analysis and interpretation, nor in the final decision to submit this manuscript for publication.

Conflict of interest

The authors have no conflict of interest to declare.

References

Aiken, L.H., Clarke, S.P., Sloane, D.M., Sochalski, J.A., Busse, R., Clarke, H., …, Shamian, J., 2001. Nurses' reports on hospital care in five countries. Health Aff. 20 (3), 43–53.

Aiken, L.H., Sloane, D.M., Bruyneel, L., Heede, K.V.D., Sermeus, W., 2013. Nurses' report of working conditions and hospital quality of care in 12 countries in Europe. Int. J. Nurs. Stud. 50, 143–153.

Al-Kandari, F., Thomas, D., 2009. Factors contributing to nursing task incompletion as perceived by nurses working in Kuwait general hospitals. J. Clin. Nurs. 18, 3430–3440.

Audet, L.-A., Bourgault, P., Rochefort, C.M., 2018. Associations between nurse education and experience and the risk of mortality and adverse events in acute care hospitals: a systematic review of observational studies. Int. J. Nurs. Stud. 80, 128–146.

Ausserhofer, D., Zander, B., Busse, R., Schubert, M., De Geest, S., Rafferty, A., …, Schwendimann, R., 2014. Prevalence, patterns and predictors of nursing care left undone in European hospitals: results from the multicountry cross-sectional RN4CAST study. BMJ Qual. Saf. 23, 126–135.
Backnick, S., Ausserhofer, D., Baernholdt, M., Simon, M., 2018. Patient-centered care, nurse work environment and implicit rationing of nursing care in swiss acute care hospitals: a cross-sectional multi-center study. Int. J. Nurs. Stud. 81, 98–106.
Bagnasco, A., Zanini, M., Aleo, G., Catania, G., Kalisch, B.J., Sasso, L., 2018. Development and validation of the misscare survey – pediatric version. J. Adv. Nurs. 74 (12), 2922–2934.
Bail, K., Grealish, L., 2016. "Failure to maintain": a theoretical proposition for a new quality indicator of nurse care rationing for complex older people in hospital. Int. J. Nurs. Stud. 63, 146–161.
Ball, J.E., Bruyneel, L., Aiken, L.H., Sermeus, W., Sloane, D.M., Rafferty, A.M., …, Griffiths, P., 2018. Post-operative mortality, missed care and nurse staffing in nine countries: a cross-sectional study. Int. J. Nurs. Stud. 78, 10–15.
Ball, J.E., Griffiths, P., Rafferty, A.M., Lindqvist, R., Murrells, T., Tishelman, C., 2016. A cross-sectional study of "care left undone" on nursing shifts in hospitals. J. Adv. Nurs. 72 (9), 2086–2097.
Ball, J.E., Murrels, T., Rafferty, A.M., Morrow, E., Griffiths, P., 2013. "Care left undone" during nursing shifts: associations with workload and perceived quality of care. BMJ Qual. Saf. 23, 116–125.
Bittner, N.P., Gravlin, G., 2009. Critical thinking, delegation, and missed care in nursing practice. J. Nurs. Admin. 39 (3), 142–146.
Blackman, I., Henderson, J., Wilis, E., Hamilton, P., Toffoli, L., Verrall, C., …, Harvey, C., 2014. Factors influencing why nursing care is missed. J. Clin. Nurs. 24, 47–56.
Blackman, I., Papastavrou, E., Palese, A., Vyronides, S., Henderson, J., Willis, E., 2018. Predicting variations to missed nursing care: a three-nation comparison. J. Nurs. Manag. 26, 33–41.
Bloomer, M.J., Clarke, A.B., Morphet, J., 2017. Nurses' prioritization of enteral nutrition in intensive care units: a national survey. Br. Assoc. Crit. Care Nurses 23 (3), 152–158.
Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. Qual. Res. Psychol. 3, 77–101.
Bruyneel, L., Li, B., Ausserhofer, D., Lasaffre, E., Dumitrescu, I., Smith, H.L., …, Sermeus, W., 2015. Organization of hospital nursing, provision of nursing care, and patient experiences with care in Europe. Med. Care Res. Rev. 72 (6), 643–664.
Carthon, J.M.B., Lasater, K.B., Sloane, D.M., Kutney-Lee, A., 2015. The quality of hospital work environments and missed nursing care is linked to heart failure readmissions: a cross-sectional study of us hospitals. BMJ Qual. Saf. 24 (4), 255–263.
Castner, J., Wu, Y.-W.B., Dean-Baar, S., 2015. Multi-level model of missed nursing care in the context of hospital merger. West. J. Nurs. Res. 37 (4), 441–461.
Cho, S.-H., Kim, Y.-S., Yeon, K.N., You, S.-J., Lee, I.D., 2015. Effects of increasing nurse staffing on missed nursing care. Int. Nurs. Rev. 62, 267–274.
Cho, E., Lee, N.-J., Kim, E.-Y., Kim, S., Lee, K., Park, K.-O., Sung, Y.H., 2016. Nurse staffing level and overtime associated with patient safety, quality of care, and care left undone in hospitals: a cross-sectional study. Int. J. Nurs. Stud. 60, 263–271.
Dabney, B.W., Kalisch, B.J., 2015. Nursing staffing levels and patient-reported missed nursing care. J. Nurs. Care Qual. 30 (4), 306–312.
De Clercq, Etienne, 2008. Problem-oriented patient record model as a conceptual foundation for a multi-professional electronic patient record. Int. J. Med. Inform. 77 (9), 565–575.
Dhaini, S.R., Zuniga, F., Ausserhofer, D., Simon, M., Kunz, R., De Geest, S., Schwendimann, R., 2017. Are nursing home care workers' health and presenteeism associated with implicit rationing of care? A cross-sectional multi-site study. Geriatr. Nurs. 38, 33–38.
Dimond, B., 2005. Exploring common deficiencies that occur in record keeping. Br. J. Nurs. 14 (10), 568–570.
Driscoll, A., Grant, M.J., Carroll, D., Dalton, S., Deaton, C., …, Astin, F., 2018. The effect of nurse-to-patient ratios on nurse-sensitive patient outcomes in acute specialist units: a systematic review and meta-analysis. Eur. J. Cardiovasc. Nurs. 17 (1), 6–22.
Duffy, J.R., Culp, S., Padrutt, T., 2018. Description and factors associated with missed nursing care in an acute care community hospital. J. Nurs. Admin. 48 (8), 361–367.
Feo, R., Conroy, T., Jangland, E., Muntlin Athlin, A., Brovall, M., Parr, J., …, Kitson, A., 2018. Towards a standardised definition for fundamental care: a modified Delphi study. J. Clin. Nurs. 27 (11–12), 2285–2299.
Friese, C.R., Kalisch, B.J., Lee, K.H., 2013. Patterns and correlates of missed nursing care in inpatient oncology units. Cancer Nurs. 36 (6).
Gasparyan, A.Y., Ayvazyan, L., Blackmore, H., Kitas, G.D., 2011. Writing a narrative biomedical review: considerations for authors, peer reviewers and editors. Rheumatol. Int. 31, 1409–1417.
Gravlin, G., Bittner, N.P., 2010. Nurses' and nursing assistants' reports of missed care and delegation. J. Nurs. Admin. 40 (7), 329–335.
Griffiths, P., Dall'Ora, C., Simon, M., Ball, J., Lindqvist, R., Rafferty, A.-M., …, Aiken, L.H., 2014. Nurses' shift length and overtime working in 12 European countries. Med. Care 52 (11), 975–981.
Griffiths, P., Recio-Saucedo, A., Dall'Ora, C., Briggs, J., Maruotti, A., Meredith, P., …, Ball, J., 2018. The association between nurse staffing and omissions in nursing care: a systematic review. J. Adv. Nurs. 74, 1474–1487.
Harris, B.D., Thomas, G.A., Green, M.H., Spires, S.S., Talbot, T.R., 2018. Ventilator bundle compliance and risk of ventilator-associated events. Infect. Control Hosp. Epidemiol. 39 (6), 637–643.
Harvey, C.L., Baret, C., Rochefort, C.M., Meyer, A., Ausserhofer, D., Ciutene, R., Schubert, M., 2018. Discursive practice- lean thinking, nurses' responsibilities and the cost of care. J. Health Organ. Manag. 32 (6), 762–778.
Hendry, C., Walker, A., 2004. Priority setting in clinical nursing practice: literature review. J. Adv. Nurs. 47 (4), 427–436.
Hessels, A.J., Flynn, L., Cimiotti, J.P., Cadmus, E., Gershon, R.R.M., 2015. The impact of the nursing practice environment on missed nursing care. Clin. Nurs. Stud. 3 (4), 60–65.
International Learning Collaborative. (2019). The fundamentals of care. Located at https://intlearningcollab.org/.
Jones, T.L., 2014. Validation of the perceived implicit rationing of nursing care (PIRNCA) instrument. Nurs. Forum 49 (2), 77–87.
Jones, T.L., Hamilton, P., Murry, N., 2015. Unfinished nursing care, missed care and implicitly rationed care: state of the science review. Int. J. Nurs. Stud. 52, 1121–1137.
Jones, T.L., 2015. A descriptive analysis of implicit rationing of nursing care: s and patterns in Texas. Nurs. Econ. 33 (3), 144–154.
Kalisch, B.J., Gosselin, K., Choi, S.H., 2012a. A comparison of patient care units with high versus low levels of missed nursing care. Health Care Manag. Rev. 37 (4), 320–328.
Kalisch, B.J., Landstrom, G.L., Hinshaw, A.S., 2009. Missed nursing care: a concept analysis. J. Adv. Nurs. 65 (7), 1509–1517.
Kalisch, B.J., Lee, K.H., 2010. The impact of teamwork on missed nursing care. Nurs. Outlook 58, 233–241.
Kalisch, B.J., Lee, K.H., Doumit, M., Zein, J.E., 2013a. Missed nursing care, level of staffing, and job satisfaction. J. Nurs. Admin. 43 (5), 274–279.
Kalisch, B.J., Tschannen, D., Lee, K.H., 2011a. Do staffing levels predict missed nursing care? Int. J. Qual. Health Care 23 (3), 302–308.
Kalisch, B., Tschannen, D., Lee, H., 2011b. Does missed nursing care predict job satisfaction? J. Healthc. Manag. 56 (2), 117–131.
Kalisch, B.J., Tschannen, D., Lee, K.H., 2012b. Missed nursing care, staffing, and patient falls. J. Nurs. Care Qual. 27 (1), 6–12.
Kalisch, B.J., Tschannen, D., Lee, K.H., Friese, C.R., 2011c. Hospital variation in missed nursing care. Am. J. Med. Qual. 26 (4), 291–299.
Kalisch, B.J., Xie, B., 2014. Errors of omission: missed nursing care. West. J. Nurs. Res. 36 (7), 875–890.
Kalisch, B.J., Xie, B., Ronis, D.L., 2013b. Train-the-trainer intervention to increase nursing teamwork and decrease missed nursing care in acute care patient units. Nurs. Res. 62 (6), 405–413.
Kane, R.L., Shamliyan, T.A., Mueller, C., Duval, S., Wilt, T.J., 2007. The association of registered nurse staffing levels and patient outcomes, systematic review and meta-analysis. Med. Care 45, 1195–1204.
Lake, E.T., Staiger, D., Edwards, E.M., Smith, J.G., Rogowski, J.A., 2018. Nursing care disparities in neonatal intensive care units. Health Serv. Res. 53 (4), 3007–3026.
Liu, X., Zheng, J., Liu, K., Baggs, J.G., Liu, J., Wu, Y., You, L., 2018. Hospital nursing organizational factors, nursing care left undone, and nurse burnout as predictors of patient safety: a structural equation modeling analysis. Int. J. Nurs. Stud. 86, 82–89.
Lucero, R.J., Lake, E.T., Aiken, L.H., 2009. Variations in nursing quality across hospitals. J. Adv. Nurs. 65 (11), 2299–2310.
Lucero, R.J., Lake, E.T., Aiken, L.H., 2010. Nursing care quality and adverse events in us hospitals. J. Clin. Nurs. 19, 2185–2195.
Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., 2009. Preferred reporting items for systematic reviews and meta-analyses: the prisma statement. PLoS Med. 6 (7).
National Quality Forum, 2004. National Voluntary Consensus Standards for Nursing Sensitive Care: An Initial Performance Measure Set — A Consensus. National Quality Forum, Washington, DC Report (NQFCR-08-04).
National Institute for Health Research (2019). Staffing on wards. Located at https://www.dc.nihr.ac.uk/themed-reviews/Ward-Staffing.pdf.
Needleman, J., Buerhaus, P., Pankratz, S.V., Leibson, C.L., Stevens, S.R., Harris, M., 2011. Nurse staffing and inpatient hospital mortality. N. Engl. J. Med. 364, 1037–1045.
Nelson, S.T., Flynn, L., 2015. Relationship between missed care and urinary tract infections in nursing homes. Geriatr. Nurs. 36, 126–130.
Numata, Y., Schulzer, M., Wal, R.V.D., Globerman, J., Semeniuk, P., …, FitzGerald, J.M., 2006. Nurse staffing levels and hospital mortality in critical care settings: literature review and meta-analysis. J. Adv. Nurs. 55 (4), 435–448.
Orique, S.B., Patty, C.M., Woods, E., 2015. Missed nursing care and unit-level nurse workload in the acute and post-acute settings. J. Nurs. Care Qual. 31 (1), 84–89.
Palese, A., Ambrosi, E., Prosperi, L., Guarnier, A., Barelli, P., Zambiasi, P., …, Saiani, L., 2015. Missed nursing care and predicting factors in the Italian medical care setting. Intern. Emerg. Med. 10, 693–702.
Papastavrou, E., Andreou, P., Efstahiou, G., 2014a. Rationing of nursing care and nurse-patient outcomes: a systematic review of quantitative studies. Int. J. Health Plan. Manag. 29, 3–25.
Papastavrou, E., Andreou, P., Vryonides, S., 2014b. The hidden ethical element of nursing care rationing. Nurs. Ethics 21 (5), 583–593.
Park, S.H., Hanchett, M., Ma, C., 2018. Practice environment characteristics associated with missed nursing care. J. Nurs. Scholarsh. 0, 1–9.
Prideaux, A., 2011. Issues in nursing documentation and record-keeping practice. Br. J. Nurs. 20 (22), 1450–1454. doi:10.12968/bjon.2011.20.22.1450.

Recio-Saucedo, A., Dall'Ora, C., Maruotti, A., Ball, J., Briggs, J., Meredith, P., ..., Griffiths, P., 2018. What impact does nursing care left undone have on patient outcomes? Review of the literature. J. Clin. Nurs. 27, 2248–2259.

RANCARE (2016). Rationing — missed nursing care: an international and multidimensional problem. Located at https://www.rancare-action.eu/.

Rochefort, C.M., Clarke, S.P., 2010. Nurses' work environments, care rationing, job outcomes, and quality of care on neonatal units. J. Adv. Nurs. 66 (1), 2213–2224.

Rochefort, C.M., Verma, A.D., Eguale, T., Lee, T.C., Buckeridge, D.L., 2015. A novel method of adverse event detection ca accurately identify venous thromboembolisms (VTEs), from narrative electronic health record data. J. Am. Med. Inform. Assoc. 22, 155–165.

Schubert, M., Glass, T.R., Clarke, S.P., Schaffert-Witvliet, B., De Geest, S., 2007. Validation of the Basel extent of rationing of nursing care instrument. Nurs. Res. 56 (6), 416–424.

Schubert, M., Ausserhofer, D., Desmedt, M., Schwendimann, R., Lesaffre, E., Li, B., De Geest, S., 2013. Levels and correlates of implicit rationing of nursing care in Swiss acute care hospitals – a cross sectional study. Int. J. Nurs. Stud. 50, 230–239.

Schubert, M., Clarke, S.P., Aiken, L.H., De Geest, S., 2012. Associations between rationing of nursing care and inpatient mortality in Swiss hospitals. Int. J. Qual. Health Care 3, 230–238.

Schubert, M., Clarke, S.P., Glass, T.R., Schaffert-Witvliet, B., De Geest, S., 2009. Identifying thresholds for relationships between impacts of rationing of nursing care and nurse- and patient-reported outcomes in Swiss hospitals: a correlational study. Int. J. Nurs. Stud. 46, 884–893.

Schubert, M., Glass, T.R., Clarke, S.P., Aiken, L.H., Schaffert-Witvliet, B., Sloane, D.M., De Geest, S., 2008. Rationing of nursing care and its relationship with patient outcomes: the Swiss extension of the international hospital outcomes study. Int. J. Qual. Health Care 20 (4), 227–237.

Shiells, Kate, Holmerova, Iva, Steffl, Michal, Stepankova, Olga, 2018. Electronic patient records as a tool to facilitate care provision in nursing homes: an integrative review. Inform. Health Soc. Care 1–16.

Smith, J.G., Morin, K.H., Wallace, L.E., Lake, E.T., 2018. Association of the nurse work environment, collective efficacy, and missed care. West. J. Nurs. Res. 40 (6), 779–798.

Sochalski, J., 2004. Is more better? The relationship between nurse staffing and the quality of nursing care in hospitals. Med. Care 42, 67–73.

Srulovici, E., Drach-Zahavy, A., 2017. Nurses' personal and ward accountability and missed nursing care: a cross-sectional study. Int. J. Nurs. Stud. 75, 163–171.

Talbot, T.R., Carr, D., Parmley, L., Martin, B.J., Gray, B., Ambrose, A., Starmer, J., 2015. Sustained reduction of ventilator-associated pneumonia rates using real-time course correction with a ventilator bundle compliance dashboard. Infect. Control Hosp. Epidemiol. 36 (11), 1261–1267.

Thomas-Hawkins, C., Flynn, L., Clarke, S.P., 2008. Relationships between registered nurse staffing, processes of nursing care, and nurse-reported patient outcomes in chronic hemodialysis units. Contin. Nurs. Educ. 35 (2), 123–145.

Van den Heede, K., Clarke, S.P., Sermeus, W., Vleugels, A., Aiken, L.H., 2007. International experts' perspectives on the state of the nurse staffing and patient outcomes literature. J. Nurs. Scholarsh. 39 (4), 290–297.

VanFosson, C.A., Jones, T.L., Yoder, L.A., 2016. Unfinished nursing care: an important performance measure for nursing care systems. Nurs. Outlook 64, 124–136.

Winters, R., Neville, S., 2012. Registered nurse perspectives on delayed or missed nursing cares in a New Zealand hospital. Nurs. Prax. N. Z. 28 (1), 19–28.

Zuniga, F., Ausserhofer, D., Hamer, J.P.H., Engberg, S., Simon, M., Schwendimann, R., 2015. The relationship of staffing and work environment with implicit rationing of nursing care in Swiss nursing homes – a cross-sectional study. Int. J. Nurs. Stud. 52, 1463–1474.