

Prevalence, patterns and predictors of nursing care left undone in European hospitals: results from the multicountry cross-sectional RN4CAST study

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ABSTRACT

Background Little is known of the extent to which nursing-care tasks are left undone as an international phenomenon.

Aim The aim of this study is to describe the prevalence and patterns of nursing care left undone across European hospitals and explore its associations with nurse-related organisational factors.

Methods Data were collected from 33 659 nurses in 488 hospitals across 12 European countries for a large multicountry cross-sectional study.

Results Across European hospitals, the most frequent nursing care activities left undone included 'Comfort/talk with patients' (53%), 'Developing or updating nursing care plans/care pathways' (42%) and 'Educating patients and families' (41%). In hospitals with more favourable work environments (B=−2.19; p<0.0001), lower patient to nurse ratios (B=0.09; p<0.0001), and lower proportions of nurses carrying out non-nursing tasks frequently (B=2.18; p<0.0001), fewer nurses reported leaving nursing care undone.

Conclusions Nursing care left undone was prevalent across all European countries and was associated with nurse-related organisational factors. We discovered similar patterns of nursing care left undone across a cross-section of European hospitals, suggesting that nurses develop informal task hierarchies to facilitate important patient-care decisions. Further research on the impact of nursing care left undone for patient outcomes and nurse well-being is required.

BACKGROUND

Various studies have indicated how the organisational contexts in which nurses work, including the quality of the work environment and adequacy of staffing levels, are linked to patient safety and quality of care.[1–3] In acute care hospitals, increased nurse staffing and skill mix levels have been linked to lower rates of mortality, fewer adverse events and shorter lengths of stay.[3–6] Aiken *et al*[7] described a synergistic relationship between the quality of the work environment and nurse staffing and educational levels, as the odds of surgical patients dying were lowest in hospitals with more favourable nurse work environments, a 4:1 patient to nurse ratio, and more than 60% bachelor-prepared staff nurses.

Despite evidence that increasing nurse staffing levels is a cost-effective intervention,[8 9] the current political and economic environments of European countries may make it difficult to achieve. Financial constraints on healthcare and nursing have led to serious shortages of nurses in some countries, while in others, healthcare austerity measures and/or moratoria on staffing are preventing health service managers from hiring nurses even where sufficient candidates are available. Faced with the fact that they cannot provide all necessary care to their patients, nurses prioritise providing the best possible care with the available resources.[10] Few studies have examined nurses' processes of deciding which care activities are done or not done in such situations. Recently, however, the need has been recognised to study the patient-to-nurse interface, with an eye to how nurses intellectually and physically

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organise and deliver necessary nursing care.[11] Over the past decade, three concepts relating to the omission of nursing care have been described in the literature: (1) nursing care left undone,[11 12] (2) missed nursing care[13 14] (3) implicit rationing of nursing care.[15] Despite differences in conceptual definitions and operationalisation, these three concepts all represent attempts to understand which nursing activities are either partially or fully omitted when resource shortages make delivering all necessary care impossible.

Ball *et al* report that nursing care activities are frequently left undone on general medical/surgical wards in National Health Service hospitals in England. The most common nursing care omissions recorded were: 'Comforting/talking with patients' and 'Developing or updating nursing care plans'.[16] Other national studies reported frequent omissions of 'Offering emotional or psychosocial support', 'Assessment of newly admitted patients', and 'Documentation of nursing care',[11 17] as well as 'assessing the effectiveness of medications', 'turning patients' and 'mouth care'.[10 18] Reasons for higher levels of omitted nursing care can often be traced to organisational factors, such as inadequate staffing levels, poor nursing teamwork and weaker hospitals' safety climate.[16 17 19–22] Recent studies suggest associations between omitted nursing care and poorer patient outcomes, including increased inpatient mortality,[23] medication errors, patient falls, pressure ulcers and nosocomial infections.[24–27] Additionally, higher levels of omitted nursing care are also associated with adverse nurse outcomes, including reduced job satisfaction, increased intention to leave and increased turnover.[25 28 29]

The current study's conceptual framework builds on research on nursing care left undone[11] and the implicit rationing of nursing care framework.[15 26] Our model describes how the nurse work environment's organisational factors may influence nursing care processes (including the decision to leave certain tasks undone), which in turn potentially impact both patient and nurse outcomes. Specifically, this study focuses on relationships between hospital organisational factors and nursing care left undone. Based on findings in previous studies, the nurse-related organisational factors chosen for this study were the quality of the nurse work environment, nurse staffing, and extent that nurses carry out non-nursing tasks.

Although nursing care left undone is likely to occur across all countries, little is known of its prevalence, patterns and predictors across European acute-care hospitals. Such information would deepen the current understanding of the obstacles nurses must overcome to provide nursing care, and clarify how these influence care quality and patient safety in European hospitals. The current study had two aims: (1) to describe the prevalence and patterns of nursing care left undone in a large sample of hospitals across 12 European countries; and (2) to explore the association between the organisational context of nursing—including the nurse work environment, nurse staffing and requirements that nurses carry out non-nursing tasks—and nursing care left undone. Our working hypothesis was that, independent of nationality; hospitals providing more favourable organisational contexts for nursing would have lower levels of nursing care left undone.

METHODS

Design

A study was carried out using European nurse survey data from the multicountry, multilevel cross-sectional RN4CAST (Nurse Forecasting: Human Resources Planning in Nursing) study. The overall research aims and methodology of this 3-years research project (2009–2011) have been previously described.[30 31] The RN4CAST study's main aim was to enrich and refine traditional nurse forecasting models by examining how the organisational context of nursing (eg, nurse work environment, staffing and educational level) impacts nurse and patient outcomes (eg, nurse retention, nurse burnout, patient satisfaction, risk-adjusted in-hospital mortality). Using a cross-sectional design, data were gathered via nurse and patient surveys, as well as hospitals' administrative and patient discharge data.[31]

Setting and sample

The RN4CAST study was conducted in 12 European countries (Belgium, England, Finland, Germany, Greece, Ireland, The Netherlands, Norway, Poland, Spain, Sweden and Switzerland).[30 31] First, in each country (except Sweden) at least 30 hospitals were recruited. To ensure that samples were as representative as possible, selection factors included geographic location, hospital size and hospital type. Second, within each hospital at least two adult general medical, surgical or mixed medical-surgical units were randomly selected where there were more than two such units available. Third, all professional nurses (ie, registered nurses as per that country's certification standards) providing direct care to patients on the selected adult medical-surgical care units (except nurses on sick leave, maternity leave or those who were on vacation), were invited to fill out the RN4CAST nurse questionnaire. In Sweden, a different sampling strategy was used. Professional nurses working in medical and surgical units were recruited via the member register of the Swedish Nursing Association.[31]

Overall, 488 European hospitals participated in the RN4CAST study and 33 659 professional nurses were surveyed, corresponding to an average response rate of 62% across the 12 European countries.[30]

Variables and measures

Data for this study were derived from nurses' responses to the RN4CAST nurse questionnaire.[31] The same instrument was used in all countries, which

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was subjected to a rigorous process of translation, pilot testing and subsequent validation.[32]

According to our research aims we used data derived from the measurement of the following variables: *nursing care left undone, the quality of the nurse work environment, nurse staffing levels, the carrying out of non-nursing duties* and *nurse and hospital characteristics*.

Outcome variable (analysed at the individual level)

According to our conceptual model, *nursing care left undone* reflects the process of care and was defined as necessary nursing activities that were missed due to a lack of time.[11 12] From a sample of 13 nursing care activities related to direct physical care and monitoring, planning and documenting care, and psychosocial care, nurses were asked to select those activities that were necessary but left undone due to a lack of time during their most recent shift. The nursing care left undone composite measure for each nurse was calculated as the sum score of how many of these 13 nursing care needs were left undone.

Explanatory variables (analysed at the hospital level)

Our explanatory variables reflect the organisational context of nursing care (see figure 1). The *quality of the nurse work environment* was measured with a revised version of Lake's Practice Environment Scale of the Nursing Work Index (PES-NWI).[33] Using a 4-point Likert-type scale (from 'strongly disagree' to 'strongly agree'), nurses were asked whether 32 specific elements of five dimensions (Staffing and Resource Adequacy, Nurse Manager Ability, Leadership, Support of Nurses, Collegial Nurse–Physician Relations, Nurse Participation in Hospital Affairs, and Nursing Foundations for Quality of Care) were present in their workplace. Construct validity (eg, construct, discriminant and criterion validity) and reliability were established for the original PES-NWI[33 34] and several language versions.[35–37] Based on previous research, the mean scores for the five PES-NWI subscales were averaged to create a composite measure, and aggregated at the hospital level.[30 31 33 38]

The following explanatory variables were calculated using single items from the RN4CAST study nurse questionnaires, whereby nurses provided information on their unit's workload for their last worked shift, that is, the number of patients and nurses involved.[31] *Nurse staffing level* was calculated by the hospital-aggregated of the total number of patients to the total number of professional nurses providing direct care on the unit over the last 24 h. *Non-nursing tasks* were defined as tasks not requiring professional nursing training[39] and that should be assigned or delegated to other staff and removed from nurses' work except in extraordinary circumstances. This concept has previously been investigated in European hospitals.[40] We used data from nurses' responses on one item about the extent ('Never', 'Sometimes', or 'Often') to which they performed non-nursing tasks (eg, delivering and retrieving food trays, transporting patients within the hospital, cleaning patient rooms and equipment, obtaining supplies or equipment, or answering phones/clerical duties). To determine the prevalence of non-nursing tasks for each hospital, we calculated the mean percentage of nurses reporting that they had often performed non-nursing tasks in their most recent shift.

Nurse factors (analysed at the individual level)

Nurse factors (see figure 1) included participating professional nurses' sociodemographic and professional characteristics, such as *gender*, *nursing education* (ie,

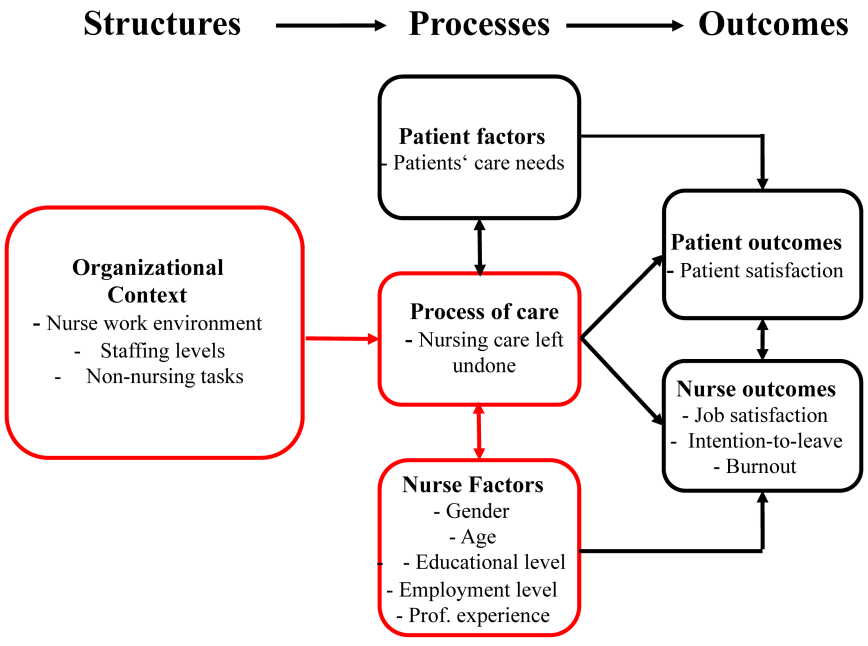


Figure 1 Conceptual model of this study (variables addressed in this paper are indicated in red).

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nurses with a bachelor or higher degree vs nurses with a diploma), *employment level* (ie, part-time vs full-time) and *professional experience in the hospital where they were currently working* (in years).

Potential confounding variables (analysed at the hospital level)

Among the *characteristics of the participating hospitals,* potentially confounding variables included *teaching status* (yes/no), *high technology*, that is, hospitals providing open heart surgery or organ transplantation (yes/no) and *hospital size* (ie, number of acute care beds).

Ethical aspects, data collection and data management

Subsequently, nurse surveys were conducted between 2009 and 2010. Except in Sweden, a designated contact person in each hospital helped to collect information on hospital characteristics and distributed the nurse survey questionnaires. In Sweden, the surveys were sent to the nurses' home addresses, with the option of either returning them by prepaid mail or completing a web-based version. Nurses were surveyed voluntarily and anonymously. Collected data were coded at study centres within the participating countries, then transferred to the coordinating centre at the University of Leuven, Belgium, where all data were stored on secure servers.

Statistical analysis

We first described nurse and hospital characteristics and the covariates under study using means, SDs, frequencies, and graphs. To isolate patterns of nursing care left undone across European hospitals and countries, we calculated the percentage of nurses per hospital who reported not having performed each of the 13 specified nursing care activities (while, in fact, they were considered necessary) and their composite scores for those activities, then calculated mean percentages and SDs for each country.

To test our hypothesis, we first computed simple three-level regression models to test the associations between each of the covariates (quality of the nurse practice environment, staffing levels, often carrying out non-nursing tasks) and nursing care left undone. Second, we performed multiple three-level regression analyses to jointly test these associations. All models included nurse and hospital characteristics as additional covariates. Although our units of observation were individual nurses, according to organisational theory the explanatory variables under study reflect properties at an organisational level rather than individual nurse characteristics.[41] As the organisational level of interest in this study was the hospital, covariates were aggregated at the hospital level. As the data were hierarchically structured (nurses within hospitals within countries), we developed a 3-level model using hospitals as random (Level 2) and countries as fixed (Level 3) effects in our linear regression analyses.

The level of significance was set at $p<0.05$. Descriptive and regression analyses were performed using SAS (SAS software, V.9.3 of the SAS System for Windows. SAS Institute).

RESULTS

Descriptive findings

Sixteen per cent of the surveyed hospitals were teaching institutions, 23% performed open-heart surgery and/or organ transplantation, and the median size (number of beds) was 356 (see table 1). Just under 93% of nurses were female. As described in table 1,

Table 1 Descriptive findings on the participating nurses, hospitals and organisational factors

	Overall (individual level)	Range across countries
Nurse characteristics (n=33 659)		
Percentage of female nurses	92.8%	89.0% (Greece) to 99.6% (Poland)
Percentage of bachelor degree nurses	54.0%	0% (Germany) to 100% (Spain, Norway)
Percentage of nurses working full-time	65.9%	42.9% (Netherlands) to 98.0% (Poland)
Professional experience in the hospital	10.3 years	6.8 years (Norway) to 15.6 years (Poland)
	Overall (hospital level)	**Range across countries**
Organisational characteristics (n=488)		
Median number of beds	356	187 (Sweden) to 645 (Poland)
Percentage of high-technology-level hospitals	23%	13.8% (Finland) to 63.4% (England)
Percentage of teaching hospitals	16%	3.6% (Netherlands) to 78.8% (Spain)
Organisational context of nursing		
Mean number of patients per nurse	8.4	5.2 (Norway) to 12.7 (Germany)
Mean nurse work environment score	2.6	2.3 (Greece) to 2.9 (Switzerland)
Percentage of nurses having often performed non-nursing tasks during last shift	33.9%	17.4% (Spain) to 61.2% (Germany)

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54% of professional nurses had bachelor degrees, 65.9% worked full-time, and nurses, on average, had 10.3 years of experience in their current hospital position. Table 1 indicates the broad variability of nurse and hospital characteristics.

The mean number of patients per professional nurse was 8.4 (Min: 5.2, Max: 12.7). Averaging the results of the five dimensions of the 4-point practice environment scale indicated neither strong agreement nor disagreement on the presence of the specific elements (Mean: 2.6, Min: 2.3, Max: 2.9). One-third of nurses (33.9%) reported often having performed non-nursing tasks (Min: 17.4%, Max: 61.2%) (see table 1).

Prevalence and patterns of nursing care left undone

Table 2 illustrates that at the hospital level, nursing care left undone ranged from as low as 9% or 10% (respectively for 'Treatments and procedures' and 'Pain management') to as high as 53% (for 'Comfort/talk with patients'). Other nursing care activities that professional nurses commonly reported leaving undone included 'Developing or updating nursing care plans/care pathways' (42%), 'Educating patients and families' (41%), 'Oral hygiene' (34%), 'Adequately documenting nursing care' (28%) and 'Adequate patient surveillance' (27%). However, for several activities, we observed high country-specific prevalence, such as 'Frequent changing of patient position' (32% in Belgium and 30% in Poland), 'Skin care' (30% in Norway) or 'Prepare patients and families for discharge' (34% in Spain).

Examining the 'Nursing care left undone—composite score' we found that across European hospitals, professional nurses reported leaving an average of 3.6 (SD=1.2) nursing care activities undone in their most recent shift. High between-country and within-country variability can be observed (see figure 2 and table 2). Compared to the European average, nurses in Belgium, Germany, Greece, Ireland and England reported leaving higher numbers of nursing care activities undone. However, it must be emphasised that these were averaged figures: in all countries some hospitals' prevalence of nursing care left undone were below the European average.

Associations between nurse-related organisational factors and nursing care left undone

All covariates of main interest (ie, relevant to the organisational context of nursing) yielded significant results in the simple three-level analyses. The findings of the multiple three-level regression analysis are shown in table 3. Hospitals with more favourable work environments, lower patient-to-nurse ratios, and fewer professional nurses reporting often carrying out non-nursing tasks had lower prevalence of nurse-reported care left undone. Female nurses, part-time employed nurses, and nurses with greater professional experience reported lower levels of nursing care left undone. Potential confounding variables, including the educational level of nurses and hospital characteristics, were not found to be significantly associated with nursing care left undone (table 3).

DISCUSSION

Recent studies on the process of care have cast light on how healthcare professionals, such as physicians and nurses, intellectually and physically organise and deliver care, and on some of the dynamics and dilemmas that they face in prioritising care at the bedside.[11 17 18 42 43] The current study examined the prevalence, patterns and predictors of nursing care left undone in a large set of European hospitals. The findings substantiate those drawn from a single country perspective (such as the study from Ball and colleagues), which have documented nurses' reports of nursing care left undone.[16] However, for the first time, we were able to determine this phenomenon's prevalence across 12 European countries with distinctly different healthcare systems and funding schemes.

We discovered similar patterns of nursing care left undone across a cross-section of European hospitals. The nursing care activities most often left undone reflect 'Psychosocial care' and 'Planning and documenting care', while activities reflecting 'Physical care and monitoring' are less frequently left undone. Thus, our findings confirm the results of national studies from England, the USA and Switzerland.[16–18 22] Based on their assessments of immediate risk and general concerns for their patient's welfare, professional nurses appear to make important decisions regarding which nursing care activities to omit. Crucial duties related to the immediate physical needs of patients, for example, patient surveillance, timely administration of medications and provision of other activities that enable patients to move safely through the system had lower prevalence of omission and appeared to receive the highest priorities. Time-consuming activities, or activities for which the required time-effort is difficult to estimate, such as talking to patients, educating patients and families or bureaucratic demands (planning functions) were more often omitted and seem to receive the lowest priorities. This might negatively impact patients' trust in nurses' attitude towards care and taint their overall in-hospital experience. Further research is needed to determine whether omitting these activities reduces patients' satisfaction with their care or increases their risk of hospital readmissions. Additionally, our findings lead to the hypothesis that faced with resource shortages, nurses have been pressured to abandon the goal of 'patient-focused care'—a core principle of nursing practice—which includes meeting patients' educational/psychosocial needs. Thus, nursing care left undone might also play an important mediating role for nurses' outcomes, including job satisfaction, intention to leave and burnout, all of which will require testing in further studies.

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Table 2 Prevalence (Mean percentages and SDs) of nursing care activities left undone in European hospitals (n=488)

	BE	CH	DE	ES	FI	GR	IE	NL	NO	PL	SE	EN	12 countries
1. Comfort/talk with patients	58.7 (15.9)	51.8 (17.1)	81.0 (11.6)	39.6 (10.7)	37.2 (13.0)	48.1 (16.7)	68.2 (13.5)	44.6 (12.3)	39.1 (9.4)	36.8 (11.0)	44.9 (10.5)	65.0 (7.9)	**52.6 (18.5)**
2. Develop or update nursing care plans/care pathways	43.4 (11.3)	38.3 (13.6)	55.2 (11.3)	46.1 (15.1)	35.7 (13.5)	39.8 (14.9)	49.5 (13.4)	37.8 (11.2)	38.7 (11.2)	37.6 (10.0)	32.9 (10.6)	46.5 (12.6)	**41.7 (13.8)**
3. Educating patients and families	44.0 (12.6)	30.9 (11.6)	51.3 (14.0)	48.9 (11.2)	25.0 (11.6)	53.7 (15.8)	58.0 (10.5)	25.7 (10.1)	25.0 (6.1)	61.0 (9.7)	25.2 (7.4)	52.1 (9.2)	**40.6 (17.1)**
4. Oral hygiene	43.3 (12.9)	24.1 (11.8)	30.2 (14.3)	47.1 (8.2)	31.3 (14.1)	60.6 (14.1)	33.0 (9.1)	23.9 (9.1)	29.9 (10.8)	41.5 (11.4)	28.8 (10.2)	28.9 (7.9)	**34.4 (14.5)**
5. Adequately document nursing care	36.3 (12.5)	19.4 (9.4)	40.7 (13.7)	20.9 (9.5)	21.3 (11.0)	37.8 (18.0)	23.8 (9.7)	17.9 (5.9)	21.6 (8.2)	19.6 (6.9)	24.6 (9.6)	32.9 (10.4)	**27.5 (13.2)**
6. Adequate patient surveillance	28.6 (12.5)	16.3 (10.5)	37.7 (12.6)	20.9 (8.9)	27.0 (12.6)	54.8 (12.7)	31.2 (10.0)	21.4 (7.4)	26.3 (8.4)	15.6 (5.2)	19.9 (7.0)	34.7 (8.4)	**27.2 (13.6)**
7. Planning care	26.5 (11.8)	19.2 (9.4)	43.7 (12.3)	29.5 (10.5)	32.8 (14.7)	42.0 (17.5)	27.8 (9.6)	13.7 (6.1)	15.8 (6.3)	38.4 (12.3)	10.0 (4.6)	27.8 (8.2)	**25.8 (14.9)**
8. Frequent changing of patient position	31.8 (19.5)	18.0 (11.8)	22.4 (13.1)	19.2 (7.6)	19.6 (12.1)	58.8 (21.1)	19.0 (9.1)	16.9 (8.6)	23.0 (9.5)	30.1 (10.5)	18.4 (7.9)	28.8 (10.5)	**24.7 (15.5)**
9. Skin care	26.5 (11.8)	16.4 (7.2)	28.5 (14.2)	24.8 (8.2)	24.0 (11.3)	57.0 (18.7)	15.5 (6.6)	17.8 (7.5)	30.1 (8.3)	20.8 (7.5)	23.5 (8.1)	21.1 (7.4)	**24.5 (12.8)**
10. Prepare patients and families for discharge	26.6 (9.5)	16.4 (5.9)	23.5 (9.5)	33.7 (9.0)	11.9 (5.9)	36.4 (14.5)	28.3 (6.7)	16.7 (7.1)	13.6 (5.0)	35.3 (8.4)	15.7 (5.4)	20.9 (7.6)	**22.4 (11.0)**
11. Administer medications on time	22.6 (10.4)	15.3 (7.9)	20.2 (10.6)	8.2 (5.8)	12.6 (7.9)	34.8 (15.2)	18.7 (8.8)	17.2 (6.7)	15.5 (5.8)	11.9 (4.6)	23.7 (7.9)	23.6 (8.6)	**19.4 (10.5)**
12. Pain management	15.7 (8.6)	8.3 (6.3)	19.7 (10.1)	4.1 (3.7)	7.3 (5.0)	27.2 (13.5)	4.4 (3.5)	11.1 (5.8)	4.6 (3.1)	5.4 (2.3)	5.5 (3.2)	7.4 (6.3)	**10.0 (9.2)**
13. Treatments and procedures	12.3 (7.7)	2.8 (3.6)	14.2 (9.4)	4.1 (3.1)	9.2 (6.3)	27.5 (20.9)	5.7 (3.6)	10.2 (4.7)	7.0 (4.3)	4.5 (2.3)	5.4 (3.1)	11.2 (6.3)	**9.2 (9.0)**
14. Composite score	**4.1 (1.1)**	**2.8 (0.8)**	**4.7 (0.9)**	**3.5 (0.7)**	**2.9 (1.0)**	**5.8 (1.2)**	**3.8 (0.7)**	**2.8 (0.8)**	**2.9 (0.7)**	**3.6 (0.7)**	**2.8 (0.7)**	**4.0 (0.7)**	**3.6 (1.2)**

The prevalence of each nursing care task left undone is based on the proportion of nurses reporting leaving the care need(s) undone. The composite was derived from the aggregated average sum of the nursing care activities left undone.
BE, Belgium; CH, Switzerland; DE, Germany; ES, Spain; FI, Finland; GR, Greece; IE, Ireland, NL, Netherlands; NO, Norway; PL, Poland; SE, Sweden; EN, England.

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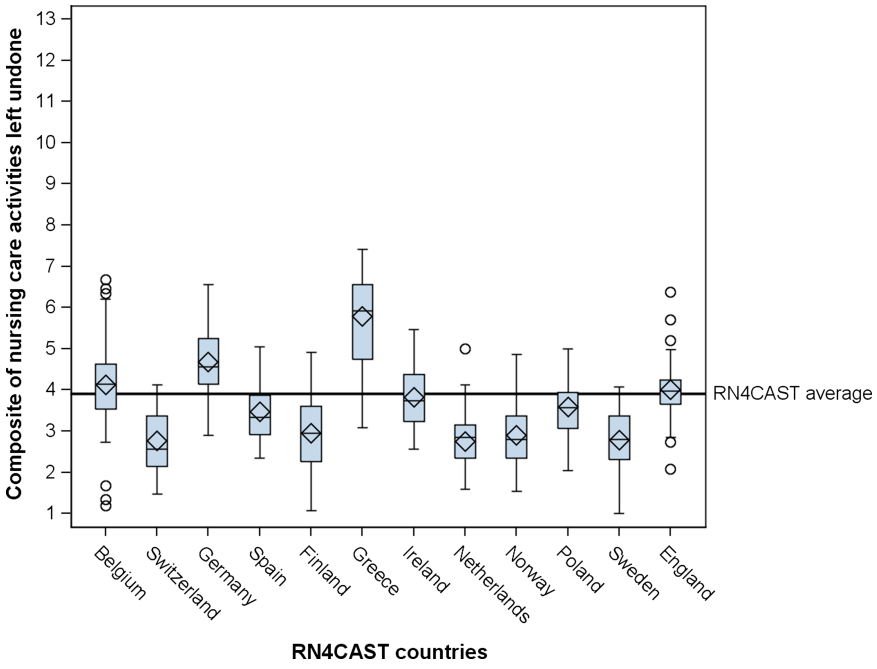


Figure 2 Between-country and within-country variability in the number of nursing care activities left undone—composite score in 488 European hospitals. The box-and-whisker plots should be interpreted as follows: The boxes means that 50% of the hospitals' nursing care left undone composite scores within the country were in the IQR, that is, between the lower quartile (25th percentile) and the upper quartile (75th percentile). The line within the box represents the median, and the rhombus the mean. The whiskers represent the minimum respective the maximum nursing care left undone scores (without outliers). The circles represent outliers.

We found high variability, nationally and internationally, in the extent to which nursing care was left undone. The high international variability might reflect macroeconomic factors, such as national economic circumstances and the differences in implementation of austerity measures that affect hospital staffing (as in Greece), as well as diverse national regulations related to the nursing workforce, including education, philosophy of nursing or professional status. However, the high national-level variability appears to operate independently of such factors. Regardless of their geographic location, nurses working in hospitals with better work environments, lower workloads and fewer requirements to carry out non-nursing tasks indicated lower prevalence of leaving nursing care undone. Thus, supporting our conceptual model and previous research, the organisational context in which nurses work was an important predictor for nursing care left undone.[17 27]

Table 3 Association between nurse-related organisational factors and nursing care left undone (n=33 659 nurses)

	Estimate	Standard error	p Value
Organisational context of nursing			
Nurse staffing	0.09109	0.01413	<0.0001
Nurse work environment	−2.1901	0.1758	<0.0001
Non-nursing tasks during last shift	2.1780	0.1922	<0.0001
Nurse factors			
Gender	0.2483	0.06567	0.0002
Education	0.1951	0.04244	<0.0001
Employment	0.1708	0.03905	<0.0001
Professional experience in the hospital	−0.01727	0.001995	<0.0001
Hospital characteristics			
Number of beds	−0.00008	0.000124	0.5198
Technology level	−0.07750	0.09712	0.4249
Teaching status	0.1148	0.1078	0.2869

Multiple multilevel linear regression model with hospital-level as random and country-level as fixed effects, accounting for the hierarchical structure of the data (nurses nested within hospitals within countries).

One very significant drain on nurses' resources is the common practice of diverting them from their nursing responsibilities. One-third of professional nurses in this study's European hospital sample reported that they often carried out non-nursing tasks. The significant association between this variable and the amount of nursing care left undone raises several important questions. First, to what extent are professional nurses' skills and resources being misused, that is, to what extent do requirements to perform non-nursing tasks result in necessary nursing care being left undone? And second, to what extent do professional nurses still perceive unskilled tasks, such as cleaning patient rooms, sanitising equipment, or obtaining supplies or equipment, as their responsibility? Clearly, hospital management decisions as to the amounts and types of resources allocated to a unit influence how that unit's nurses will prioritise their care. In view of resource scarcities in health care,

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including nurse shortages, effective leadership strategies will be required to deploy resources efficiently.[44]

The quality of the work environment had the strongest effect, suggesting that specific elements such as nurse manager ability, leadership, support of nurses, and collegial nurse–physician relations influence the way nurses organise and deliver necessary nursing care. These qualities exist independently of national healthcare systems. Some hospitals in all countries have found ways to organise effective and efficient nursing care. Additional country-specific analyses are needed to gain a deeper understanding of the variability between hospitals within the same country. Future studies should also investigate care processes in each country's highest-performing hospitals in more depth so that their practices can be adopted by other hospitals within the same country.[45 46]

Limitations

Although this study used nurse survey data from a large European nurse sample, several limitations have to be considered when interpreting its findings. Due to the cross-sectional nature of the study design, for example, findings cannot establish causality. Another limitation concerns the measurement of our main outcome, that is, nursing care left undone. The RN4CAST research group selected 13 specific nursing care activities to represent the essential processes of nursing care. This measure provides only a snapshot on what happens at the patient-to-nurse interface, that is, what nurses 'do or do not do' for their patients. Although we observed similar patterns of nursing care left undone across European hospitals, we must acknowledge that this measure does not reflect the fact that which nursing care is actually provided to patients depends on which activities nurses perceive as most necessary, that is, how they set their priorities. 'Missed nursing care' and 'implicit rationing of nursing care' are more refined concepts and measures than nursing care left undone, and provided more comprehensive insight on how nurses organise and deliver necessary patient care. We used a simple check box questionnaire to ask nurses to select those activities that were necessary but left undone due to a lack of time. A fifth of the nurse sample did not select any of the nursing care activities listed. However, since we were unable to differentiate those nurses that did not answer (interpreted as missing value) from those that reported that none of the nursing care activities were left undone we decided to handle all such cases as 'no nursing care was left undone'. We are therefore confident that we avoided overestimating the prevalence of nursing care left undone. Furthermore, some of the between-variability and within-variability might have been due to social desirability bias, that is, cultural factors that influenced the reporting on which nursing care activities are more socially acceptable to miss and to report.

Lastly, based on the nature of our multilevel analysis, we included hospitals and countries as random and fixed intercepts, respectively, and adjusted for variance due to the nested data structure. Although this allowed us to generalise findings from the regression analysis across European hospitals, we observed considerable within-country variability, which would merit further analysis on the interaction effects between country and covariates to explore the consistency of the overall effects across the 12 countries.

CONCLUSIONS

In spite of distinctly different healthcare systems and funding schemes, the phenomenon of nursing care left undone appears to be common across European countries. The current study's findings indicate that, across European hospitals, professional nurses are making important decisions about which necessary nursing care to perform and which to omit. Their highest priority activities are those which, if omitted, are likely to have immediate negative consequences for patients' physical health (eg, administering medications on time); their lowest are time-consuming activities or activities for which the required time-effort is difficult to estimate (eg, 'psychosocial care' and 'planning and documenting care').

Leaving nursing care tasks undone potentially creates situations of moral and role conflict, which may increase job-related burnout and reduce nurse retention. Management efforts to improve nurse work environments and reduce nurses' non-nursing duties offer some potential to reduce omitted nursing care. Additional research is needed to determine the impact of nursing care left undone on patient outcomes, particularly patient satisfaction and hospital readmission rates. Finally, with regard to the increasing shortage of qualified nurses, research is necessary on the association between nursing care left undone, nurse burnout and the higher risk of nurse turnover.

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