



# Unfinished Nursing Care Survey: A development and validation study

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## Funding information

This study has not received any specific grant from funding agencies in the public, commercial or non-for-profit sectors. This research study was supported by COST OC-2015-2-20085 Rationing-Missed Nursing Care: An international and multidimensional problem.

## Abstract

**Aims:** To develop and validate a comprehensive tool based on those established in the field capable of reflecting the broader concept of Unfinished Nursing Care.

**Background:** Different tools have been established in the field of Missed Care, Rationing Care and Tasks Left Undone. However, despite them sharing similar items and all referring to the common concept of Unfinished Nursing Care, no attempts to collapse them in a single tool capable of reflecting current nursing practice, and its increased complexity, have been attempted to date.

**Methods:** A development and validation study was performed in 2017. After developing the instrument starting from the MISSCARE Survey and critically reviewing the other tools available in the field, the Unfinished Nursing Care Survey (UNCS) was subjected to validation. A total of 1977 nurses from 13 acute Italian hospitals were recruited. Acceptability, construct validity (Mokken Scaling, Explorative and Confirmative Factor Analysis), internal consistency, hypothesis testing and criterion validity were assessed according to the COnsensus-based Standards for the selection of health Measurement INstruments guideline.

**Results:** 1,400 (70.8%) nurses participated. The UNCS is composed of part A (=elements of unfinished care) and part B (=reasons for unfinished care) with 21 and 18 items, respectively. The UNCS has showed high acceptability (>90%). Part A has reported a strong scalability ( $H = .52$ ), thus suggesting a hierarchical structure among the items. The six factors in part B explained a total variance of 64.3% (internal consistency = .806) as confirmed by the Confirmative Factor Analysis.

**Conclusions:** The comprehensive nature of the UNCS can contribute to the establishment of a common reference measure of the phenomenon worldwide although its psychometric properties require future investigation in different cultural contexts, languages and clinical settings.

**Implications for Nursing Management:** Measuring Unfinished Nursing Care provides information on the processes implicated in the development of adverse events before these become visible; moreover, it can increase awareness on nurses' performance and inform appropriate interventions to improve it.

**KEYWORDS**

development, instrument, missed nursing care, rationed nursing care, unfinished nursing care, validity

## 1 | INTRODUCTION

A wide scientific and professional debate has emerged recently on the phenomenon of missed nursing care as any aspect of the required patient care that is omitted either in part or as a whole, or delayed (Kalisch et al., 2009). Previously, the concepts of Tasks Left Undone (Aiken et al., 2001) and Implicit Rationing of Nursing Care (Schubert et al., 2007) expressing the inability to carry out necessary nursing procedures for patients due to a lack of nursing resources have been used. Although these conceptual models have been reported to be different for what concerns the presumed reasons for the phenomenon as well as the elements of nursing care at risk of being missed, they have been found to have some similarities and all referred to the overarching term of 'Unfinished care' (Jones et al., 2015).

Unfinished Nursing Care has been identified as a plausible indicator of hospital nursing care quality (VanFosson et al., 2016). However, the contribution of nurses to patient outcomes has not been fully quantified yet because of the lack of available measures able to detect causal links between nursing care and clinical outcomes (Jones, 2016). In this context, the associations found between nurse staffing, missed care and mortality (e.g. Ball et al., 2018) suggest that measuring Unfinished Nursing Care could be a useful process measure in hospitals, as it reflects the relationship between nurse staffing and patient outcomes.

To date, Unfinished Nursing Care has been measured mainly through nurses' self-reports by using survey instruments developed within the above-mentioned conceptual models: specifically, three families of instruments have been established, as (a) the MISSCARE Survey (Kalisch & Williams, 2009), (b) the Basel Extent of Rationing of Nursing Care (BERNCA, Schubert et al., 2007) and (c) the Task Undone (Aiken et al., 2001). Within these, two different generations of instruments have been documented to date: (a) the first aimed at validating the original tools and then at disseminating it in different cultural contexts and languages (e.g. Gurková et al., 2019); and (b) the second aimed at developing substantially the tool structure for different targets (e.g. MISSCARE-SP [survey patients]; Kalisch et al., 2014).

However, according to a recent systematic review, above-mentioned tools have been documented as having strengths and limitations that need to be considered while increasing the capacity to measure missed or rationed nursing care in the near future (Palese in press). Among the limitations, the risk of overemphasizing the measurement of the nurses' behaviour (e.g. performing oral care) based on its visible part while missing the invisible one (e.g. caring) has been reported (Palese in press). Additionally, original tools have been mainly developed in the new millennium (Aiken et al., 2001; Kalisch & Williams, 2009; Schubert et al., 2007); tools established as second generation have been developed mainly with the intent of adapting the original ones to different cultures and languages, thus substantially maintaining their items and structure. Moreover, despite tools

available being checked for similarities among items (Jones et al., 2015) and all referring to the overarching concept of Unfinished Nursing Care, no attempts to evaluate their concurrent validity or to collapse them in a single tool have been performed to date. As a consequence, despite the important body of knowledge in the field, a unique reference measure has not been established: therefore, for researchers, data collected with different tools remain not comparable thus limiting the further accumulation of evidence. For nurse managers, any attempt to introduce performance measures (VanFosson et al., 2016) to benchmark data as well as interventions aimed at minimizing the care omissions is prevented. Also, given that not all available tools are capable of detecting the reasons underlying the phenomenon (Palese in press), diagnosing its occurrence without predicting the potential factors contributing might prevent appropriate interventions and the evaluation of their effectiveness.

On the other hand, nursing practice is constantly evolving and tools available are at risk of becoming obsolete. Specifically, nursing practice is moving from tasks to processes of care (Palese in press): however, no attempts have been performed to date to measure both the process of care (e.g. nursing care planning; in BERNCA, Schubert et al., 2007) and nursing tasks (e.g. nutrition, mobility; Kalisch & Williams, 2009), thus more capable of reflecting the complex role of nurses. Moreover, available studies both validating and/or measuring the phenomenon have involved also nursing aides (NAs, Blackman et al., 2018): however, they have different educational backgrounds, scopes of practice and responsibilities towards patients and families. Furthermore, with the increased number of NAs among staff (Twigg et al., 2016), their supervision has become a key responsibility of nurses that has never been considered as a potential element of Unfinished Nursing Care itself.

Therefore, despite the important contribution offered to date by available tools, according to the literature (Jones, 2014; Jones et al., 2015; Palese in press) quantifying Unfinished Nursing Care is still a challenge and more research is needed to determine which instruments and/or which subsets of items are best suited for measuring the phenomenon and its presumed causes. For this reason, the main purpose of this study was to improve the knowledge available in the field, by developing and validating a comprehensive tool based on those established in the field thus capable of reflecting the broader concept of Unfinished Nursing Care, according to the current nursing practice, and its increased complexity both in the processes and in the contributing factors influencing it.

## 2 | AIM

To develop and validate a comprehensive tool based on those established in the field capable of reflecting the broader concept of Unfinished Nursing Care.

### 3 | METHODS

#### 3.1 | Design

A development and a validation study designs were performed following two steps:

1. phase 1: aimed at developing the tool and at assessing its cross-cultural, content and face validity, and
2. phase 2: aimed at validating the tool for acceptability, construct validity, internal consistency, hypothesis testing and criterion validity.

The properties established in the COnsensus-based Standards for the selection of health Measurement INstruments guideline were evaluated (Mokkink et al., 2010) (Table S1).

#### 3.2 | Phase 1: Unfinished Nursing Care instrument development

The following steps were performed: (a) clarifying and determining the concept, (b) generating an item pool, (c) determining the format for measurement, (d) performing the expert review on the initial item pool and (e) conducting the preliminary item face and content validation.

First, the overarching term 'Unfinished Nursing Care' was established as the basis of the tool development (Jones et al., 2015). Then, with the purpose of generating the item pool, the MISSCARE Survey (Kalisch & Williams, 2009) in its Italian validation (Sist et al., 2017) was considered as composed by: (1) part A—elements of missed care, an inventory of nursing activities, and (2) part B—reasons for missed care, an inventory of potential reasons of why care activities are delayed or missed. A critical analysis of part A was undertaken to better fit (a) the cultural and organisational changes in health care contexts, (b) the scope of the current nursing practice and (c) available literature, by including missed items and removing non-applicable items or the redundant ones (Palese in press). Part B underwent a similar critical evaluation process. This phase was undertaken after sharing and discussing the purpose of the study directly with prof. Beatrice J. Kalisch, who had also given the permission to translate and validate the MISSCARE Survey (Kalisch & Williams, 2009) in the Italian version of the tool (Sist et al., 2017).

The second tool considered was the BERNCA (32 items, Schubert et al., 2007). After asking for the Author's permission, some items such as 'Supervising care plan/priorities for each patient' were totally or partially borrowed from the BERNCA tool. Moreover, in order to reflect a measure able to detect all elements of nursing care as those related to caring, a third tool was considered, that is the Italian version of the Caring Behaviors Inventory (Tomietto et al., 2014).

At the end of phase 1, the MISSCARE Survey (Sist et al., 2017) part A was modified as follows: (a) the total number of items was changed from 24 to 33, (b) 10 out of 33 items were left unchanged, (c)

10 out of 33 items were reworded, (d) 13 out of 33 items were newly added, and (e) four items were removed as reported in Table S2 (full data description of the process is available from Authors).

Then, the format for measurement was established: the order of items was changed starting from the ones describing the nursing care process at the beginning of the working shift to the ones at the end of the shift, in order to facilitate the recall process and the completion of the survey. Recall time was also modified from 'not specified' to 'the last 7 working days' (Schubert et al., 2007) in order to limit recall bias. In terms of response options, the original Italian MISSCARE (Sist et al., 2017) part A was based on a 5-point Likert scale, ranging from 1 'never' to 5 'always' missed. In the tool under development, the option 'Not applicable in my setting' was added. On the other hand, part B was ranked according to a 5-point Likert scale, from 1 'not a significant reason' to 5 'a very significant reason'.

The developed tool has been then tested for face and content validity by involving a panel of 10 expert nurses purposefully selected at the national level according to their clinical nursing experience and their advanced education at the PhD level (completed or ongoing). They received explanations on the developed tool, and then, they were asked to express their agreement for face and content validity on an individual basis. The Content Validity Index (CVI) (Dilorio, 2006) was calculated for both part A and part B by the number of raters scoring an item with a 3 or 4 (very or highly relevant) divided by all participating experts. The total CVI for part A was .98, and the total CVI for part B was .94. No single item was rated less than .78 both in part A and part B, thus implying that all items included in the tool were considered relevant.

Face validity performed by involving the same above-mentioned experts, highlighted the need to rephrase 10 items in part A and six items in part B. Additionally, based on the experts' suggestions, four items were added in part A, eight added in part B and one removed. At the end of this phase, the developed instrument named 'Unfinished Nursing Care Survey' (NCS) was formed by 37 items in part A and 26 in part B.

#### 3.3 | Phase 2: Instrument validation

##### 3.3.1 | Participants

With the aim of assessing the psychometric properties of the developed tool, a national call promoted by the Italian Nurse Director Association was launched by using their formal and informal networks. A total of 13 hospitals (10 public, 3 private) voluntarily accepted to take part in the study. These hospitals were geographically spread out from North to South, and seven of them had a teaching status.

All medical-surgical units ( $n = 110$ ) in the 13 enrolled hospitals were eligible, and all clinical RNs, working full time or part-time, were invited to participate in the survey. All RNs not involved in direct patient care and not willing to participate were excluded; moreover, student nurses, newly hired nurses (<3 months of

experience), and NAs were also excluded. Given that 2–20 participants were expected for each item (Kline, 1979), or at least ten as reported by Dilorio (2006), a sample size of 370–740 RNs was established. By considering the inclusion criteria, a total of 1977 of RNs was eligible.

With the aim of assessing the criterion validity, given that a gold standard in the field has not been established to date (Palese in press), the global nurse managers' (NMs) perception of unfinished care was also evaluated. Therefore, a convenience sample of NMs employed in two hospitals included in the project, randomly selected, was involved in the study. NMs who were working in the participant medical–surgical units of hospitals and who were willing to participate were deemed eligible. A total of 17 NMs agreed to participate.

### 3.3.2 | Data collection

Data collection was performed between March and November 2017. All eligible RNs were invited by the contact people in each hospital to complete the survey, after having explained in written and in verbal form the main aims of the study and the data collection procedures, as well as the confidentiality of the data collected. In addition to the tool that was self-administered anonymously, a demographic/background section (e.g. age, gender) was included. The paper–pencil survey was distributed and then collected in a closed box placed in the participating units after 3 weeks; the contact person in each hospital provided two reminders during the study period.

Moreover, in order to measure the NMs perception of unfinished nursing care, the global score 'How often nursing care is unfinished in your unit?' was used based on a 5-point Likert scale ranging from 1, 'never' to 5 'always'. A paper and pencil survey was administered to the NMs by the contact person of the hospital after having explained in written and in verbal forms the main aim of the study, its procedures, as well as the confidentiality of the data collected. Nurse managers were also asked to include some additional demographic and background data: however, for the purposes of this study, these data were not considered. The NMs questionnaire was collected in the same closed box placed in the participating units.

Both questionnaires were pilot tested by including 10 RNs and five NMs, respectively: no changes were required and the estimated time for completion of the survey was 25–30 min for the RNs and 10 min for the NMs.

### 3.3.3 | Data analysis

The analysis of the data collected was developed considering both descriptive and inferential methods. The Shapiro–Wilk test was used to test for normality of distribution of the continuous variables. In the presence of symmetry of the distributions, the

variables have been summarized with the mean and Standard Deviation (*SD*,  $\pm$ ) and Confidence Interval (CI) at 95% or, in the case of non-normal distribution, with the median value and interquartile range [IQR]. The distributions of the categorical data were investigated by considering absolute frequencies and percentages. Then, according to the aims of the study, we have performed the analysis reported in Table 1. All analyses were performed using IBM SPSS Statistics and R software for MSA (Mokken package), and SPSS Version 24.00. In all analyses, *p* value < .05 was defined as statistically significant.

## 4 | RESULTS

### 4.1 | Participants

Out of the 1977 RNs invited, 1,400 (70.8%) participated (Table 2). Respondents were mainly female (1,096; 78.3%), aged 35–54 (857; 61.2%), educated at the university level as a nurse (777; 55.5%) and working at the time of the survey more than 30 hr a week (1,263; 90.2%). Participants reported to have had on average 14.44 ( $\pm 7.29$ ) patients during the last shift, and to have managed on average 2.07 ( $\pm 3.55$ ) admissions and 1.61 ( $\pm 3.06$ ) discharges. At the time of the survey, involved RNs were working in medical (616; 44%) and surgical (610; 43.5%) units.

### 4.2 | Acceptability

For part A of the UNCS, 96% of respondents filled in completely the tool without omitting any item. In 94.6% of cases, part B was completed without omitting any item.

### 4.3 | Construct validity, internal consistency, criterion validity and hypothesis testing

#### 4.3.1 | Part A—elements of Unfinished Nursing Care

Table 3 shows the outcome of the Mokken Scale Analysis performed. The first column shows the retained items ordered according to their increasing difficulty from top to bottom. As the focus of this study was to validate a tool for measuring unfinished care as perceived by nurses, 'difficulty' is meant as the difficulty to unfinish care. The nursing interventions at the top of the table have received lower priority meaning that RNs have less difficulty in omitting or delaying them, while the ones at the bottom have received higher priority and RNs have more difficulties in leaving them unfinished. The scalability coefficient for each item ( $H_i$ ) was greater than the lower bound limit of 0.30 and the overall scale had  $H = .52$ , indicating a strong scalability. Data were checked for violations of IIO, and sequential removal of the items with highest significant number of violations of IIO was performed: 17 steps were required, 16 items removed. At the point where there were

**TABLE 1** Data analysis

Acceptability: measured as the percentage of missed items.

Construct validity: according to the framework of Classical Test Theory, Exploratory and Confirmatory Factor Analyses (EFA, CFA) were performed. Specifically, the EFA and the CFA were applied to part B and not to part A as this is composed of a list of independent nursing actions not necessarily related to one another (Kalisch & Williams, 2009). In fact, the Mokken Scale Analysis was used as a complement to Classical Test Theory as a method based on the Item Response Theory used to investigate the structural validity in case of unidimensional concept (Watson et al., 2012).

Part A: the scale reliability was measured using Rho coefficient, as expected in Mokken Scale Analysis (Van der Ark, 2012). Values  $> .7$  were considered acceptable. The goodness of fit of the model was assessed by computing the Loevinger H-coefficient (scalability); the scale was considered weak if  $.3 \leq H < .4$ , moderate if  $.4 \leq H < .5$  and strong if  $H > .5$ . The Invariant Item Ordering (IIO) was assessed using  $H^T$ . Similarly, to H, IIO was considered weak if  $.3 \leq H^T < .4$ , moderate if  $.4 \leq H^T < .5$  and strong if  $H^T > .5$ .

Part B: on a preliminary basis, the data set was randomized in two sub-datasets by removing all missed items and according to: age, gender, geographic areas (north, centre, south of Italy), hospitals and units. Then, the EFA was performed by using the Principal Component Analysis method (Promax rotation) with factors loadings threshold set at 0.450 (available from authors). The adequacy of the sample was assessed by evaluating the Kaiser-Meyer-Olkin. The factors emerged were named by an inductive approach by three researchers (see authors) (Vaismoradi et al., 2013). The CFA was then performed in the second sub-dataset, and findings were evaluated by means of: Comparative Fit Index (CFI), Root-Mean-Square Error of Approximation (RMSEA) and Tucker-Lewis Index (TLI). The Internal consistency reliability was estimated using Cronbach's  $\alpha$ . The CFA was estimated with the lavaan R package (Rossee, 2012).

Hypothesis testing: the following hypothesis was formulated and tested: 'Increased experience in the current unit is associated with a higher perception of identified unfinished care, as measured by total averages ranging from 1 to 5'. Literature available (e.g. Palese et al., 2015) has documented that RNs with more experience report a higher perception of unfinished care, possibly because they feel not capable of offering care as good as they were able to offer before the current material and human resources shortages, increased complexity of patients' conditions and shorter hospitalization. Specifically, hypothesis testing was performed comparing the means scores of unfinished nursing care as perceived by RNs with  $> 10$  year of experience in the current unit versus the less experienced ones. Student's  $t$  test was performed to identify differences among groups of nurses.

Criterion validity: literature findings (Kalisch & Lee, 2012) have shown that when comparing two groups (RNs and NMs) there is a lack of congruence in reporting unfinished care: staff nurses report less missed care than NMs, who tend to overestimate the phenomenon. Specifically, the overall Unfinished Nursing Care mean score as perceived by RNs at the unit level was compared with the score as perceived by the NMs of the same unit. Differences were identified by performing Student's  $t$  test.

no further significant violations of IIO, 21 items were retained. Part A showed moderate IIO ( $H^T = .38$ ) and high reliability (Rho = .96).

As hypothesized, RNs with more experience reported a higher perception of unfinished nursing care: the mean score perceived by those nurses with  $> 10$  years of experience in the current unit was  $2.25 \pm 0.89$  versus  $2.14 \pm 0.83$  for less experienced nurses ( $p < .05$ ).

Finally, to test criterion validity, staff nurses involved in the present study reported lower scores of unfinished nursing care as compared to NMs (mean score  $2.07 \pm 0.41$  vs.  $3.12 \pm 0.49$ ,  $p < .0001$ ).

### 4.3.2 | Part B—reasons for Unfinished Nursing Care

At the EFA (data available from authors), a six-factor solution emerged by leaving 18 items out of the original 26 items. The first factor, named 'Communication', was composed of five items (variance explained = 19.6%;  $\alpha .890$ ); the second factor was named 'Priority setting' and composed of three items (variance = 11.7%;  $\alpha .755$ ); the third, 'Nurses' aides supervision' was composed of four items (10.8%;  $\alpha .853$ ); the fourth, 'Material resources' of three items (8.3%;  $\alpha .766$ ); the fifth, 'Human resources' of two items (7.3%;  $\alpha .734$ ) and the final was 'Work flow predictability', composed of two items (6.7%;  $\alpha .732$ ). The overall explained variance was 64.3%, while the overall internal consistency was  $\alpha .806$ .

At the CFA, the construct validity was confirmed by the following data: the CFI was 0.929, the TLI was 0.909, the RMSEA was 0.075, and the SRMR was 0.045 (Figure 1).

The most significant reason for unfinished nursing care as perceived by RNs was the 'Priority setting' issues (average score 2.56, CI 95% 2.52–2.61) followed by 'Nurse Aides supervision' issues (2.55, CI 95% 2.50–2.60) as reported in Table 4.

## 5 | DISCUSSION

The purpose of this study was to develop and validate a comprehensive tool based on those established in the field and capable of reflecting the broader concept of Unfinished Nursing Care in medical and surgical units in Italian acute hospitals. The tool was originated from the Italian MISSCARE (Sist et al., 2017), and it has included items derived from the BERNCA (Schubert et al., 2007) and the Caring Behaviour Inventory in its Italian validation (Tomietto et al., 2014). To our best knowledge, this is the first study attempting to develop an instrument for 'unfinished nursing care' established as an overarching concept covering all those developed in the field (Jones et al., 2015) by collapsing elements belonging to the three families of tools established in the field.

### 5.1 | Part A—elements of Unfinished Nursing Care

To our best knowledge, this is the first validation study in this field using the Mokken Scale analysis to assess the structural validity of the tool. In previous studies (e.g. Gurková et al., 2019), the Principal Component Analysis was used to extract factors and assess the internal structure of the tool. The one-factor solution accounted for most of the variance highlighting the unidimensional nature of the concept investigated in part A. Even if several dimensions of missed care or implicit rationing were assumed to

TABLE 2 Participants' characteristics

Variables	N (%)
Age class	
≤25	91 (6.5)
26–34	324 (23.1)
35–44	403 (28.8)
45–54	454 (32.4)
≥55	110 (7.9)
Missing	18 (1.3)
Gender	
Male	298 (21.3)
Female	1,096 (78.3)
Missing	6 (4)
Education as a RN	
Nursing diploma	578 (41.3)
Bachelor's degree in nursing	777 (55.5)
Master's degree in nursing	23 (1.6)
Other	14 (1)
Missing	8 (6)
Unit type	
Medical	616 (44)
Surgical	610 (43.5)
Mixed medical–surgical	66 (4.8)
Missing	108 (7.7)
Experience in role as a RN	
≤6 months	8 (0.6)
6 months–2 years	108 (7.7)
2–5 years	158 (11.3)
5–10 years	206 (14.7)
>10 years	878 (62.7)
Missing	42 (3)
Experience on current unit	
≤6 months	59 (4.2)
6 months–2 years	227 (16.2)
2–5 years	202 (14.4)
5–10 years	275 (19.6)
>10 years	596 (42.7)
Missing	41 (2.9)
Shift type	
Rotating shift	1,103 (78.7)
Day shift	153 (10.9)
Mixed	129 (9.3)
Missing	15 (1.1)
Weekly worked hours	
≤30	72 (5.2)
>30	1,263 (90.2)
Missing	65 (4.6)

(Continues)

TABLE 2 (Continued)

	Median [IRQ]	Mean (SD)
Patients cared (for each nurse, last shift)	12 [10–18]	14.44 (7.2)
Patients admitted (for each nurse, last shift)	1 [0–3]	2.07 (3.5)
Patients discharged (for each nurse, last shift)	1 [0–2]	1.61 (3.0)

Abbreviations: IRQ, interquartile range [25° percentile 75° percentile]; SD, standard deviation.

exist, multidimensionality has been confirmed only in Papastavrou et al. (2016). Kalisch (2006), in her qualitative study, identified nine themes related to elements of care that are regularly missed and the MISSCARE Survey first validation study (Kalisch et al., 2009), originally yielded a four-factor solution to part A. However, further study results on psychometric testing (Kalisch & Williams, 2009) did not support the underlying factors of the structure for part A given that it contains a list of independent nursing interventions, not necessarily related to one another. The validation studies of all the other tools derived from the original MISSCARE Survey (e.g. Sist et al., 2017) brought to overlapping findings, confirming the evidence that factor analysis is not appropriate to test structural validity for part A.

Mokken scales are assumed to be unidimensional, and items are assumed to be locally stochastically independent. Items in a Mokken scale are ordered in terms of their 'difficulty', and in this sense, difficulty refers to psychometric difficulty or the likelihood that an item will be endorsed. The results of our study showed that items were consistently ordered by the respondents and formed a hierarchy. This means that nursing activities in part A of the tool can be ordered according to a degree of difficulty reflecting a degree of priority. The items run, in term of increasing priority, from providing mouth care to patients who need it, spending time with patients and their caregivers, supervising the tasks assigned to nurse aides, involving patients and caregivers in discharge planning and communicating with them. Participants ranked as the most difficult, or in other words, as having the highest priority performing bedside glucose monitoring as prescribed, recording vital signs as planned and performing clinical handover to adequately update the next shift nursing team about patients' condition.

The order of the 21 items retained in part A, as emerged from the Mokken Scale Analysis showed that nurses 'more easily' leave unfinished interventions in the area of caring/emotional support and 'less easily' those related to medical, technical and therapeutic treatments. As in previous studies (Schubert et al., 2013), tasks with a more direct and visible effect on patient's health condition, as bedside glucose monitoring, received higher priority than those whose potential effects were less immediate or direct, like mouth care or patient emotional support. Moreover, nursing activities for which the required amount of time cannot be exactly estimated, or where there is no room for shortcuts, appeared to be another factor driving

**TABLE 3** Mokken Scale Analysis of items included in part A—Elements of Unfinished Nursing Care

Items	N	Mean score <sup>a</sup>	CI 95%	H <sub>i</sub> (SE)
Provide mouth care to patients who need it	1,301	2.67	2.60–2.73	.47 (.028)
Spend time with patients and their caregivers	1,400	2.54	2.47–2.60	.56 (.023)
Supervise the tasks assigned to the nurse aides	1,287	2.54	2.48–2.60	.52 (0.022)
Involve patients and caregivers in the discharge planning	1,343	2.45	2.39–2.51	.53 (.019)
Communicate with patients and caregivers	1,356	2.47	2.41–2.53	.54 (.023)
Ensure patients' comfort (microclimate, patient positioning)	1,342	2.42	2.35–2.48	.53 (.019)
Teach patients and caregivers how to self-care at home	1,341	2.37	2.31–2.44	.52 (.022)
Assess the effectiveness of the care provided, for example reviewing if nursing care needs have been met	1,348	2.31	2.24–2.37	.54 (.017)
Prevent negative outcomes for patients at risk (e.g. falls, pressure ulcers, malnutrition)	1,356	2.10	2.04–2.16	.54 (.018)
Document properly the interventions provided and the revision of the care plan	1,339	2.16	2.09–2.22	.51 (.020)
Respond promptly to patients' calls (within 5 min)	1,357	2.13	2.07–2.20	.46 (.021)
Perform physical assessment (e.g. skin integrity, invasive device insertion site)	1,353	2.02	1.96–2.08	.54 (.019)
Monitor administered medications effects	1,400	1.88	1.81–1.94	.56 (.019)
Prevent health care associated infections adopting good clinical practice (e.g. hand hygiene between patients, closed urinary drainage system)	1,363	1.94	1.88–2.01	.57 (.019)
Check pressure ulcers and change dressing according to protocols	1,344	1.94	1.88–2.01	.53 (0.021)
Monitor pain as planned	1,350	1.91	1.84–1.97	.56 (.020)
Administer PRN medications within 15 min from the patient's request	1,347	1.85	1.79–1.91	.54 (.022)
Provide personal hygiene to patients who need it	1,400	1.78	1.71–1.85	.54 (.025)
Perform clinical handover to adequately inform the next shift nursing team about patients' conditions	1,355	1.75	1.68–1.81	.65 (.021)
Record vital signs as planned	1,355	1.61	1.55–1.68	.70 (.026)
Perform bedside glucose monitoring as prescribed	1,341	1.60	1.53–1.66	.72 (.028)

Note:  $H = 0.52$  (0.014);  $H^T = 0.38$ ;  $Rho = 0.96$ .

Abbreviations: CI, Confidence Interval;  $H_i$ , scalability;  $H^i$ , single item scalability,  $H^T$ , mean distance between scale items; PRN, pro re nata (as needed); Rho, scale reliability; SE, standard error.

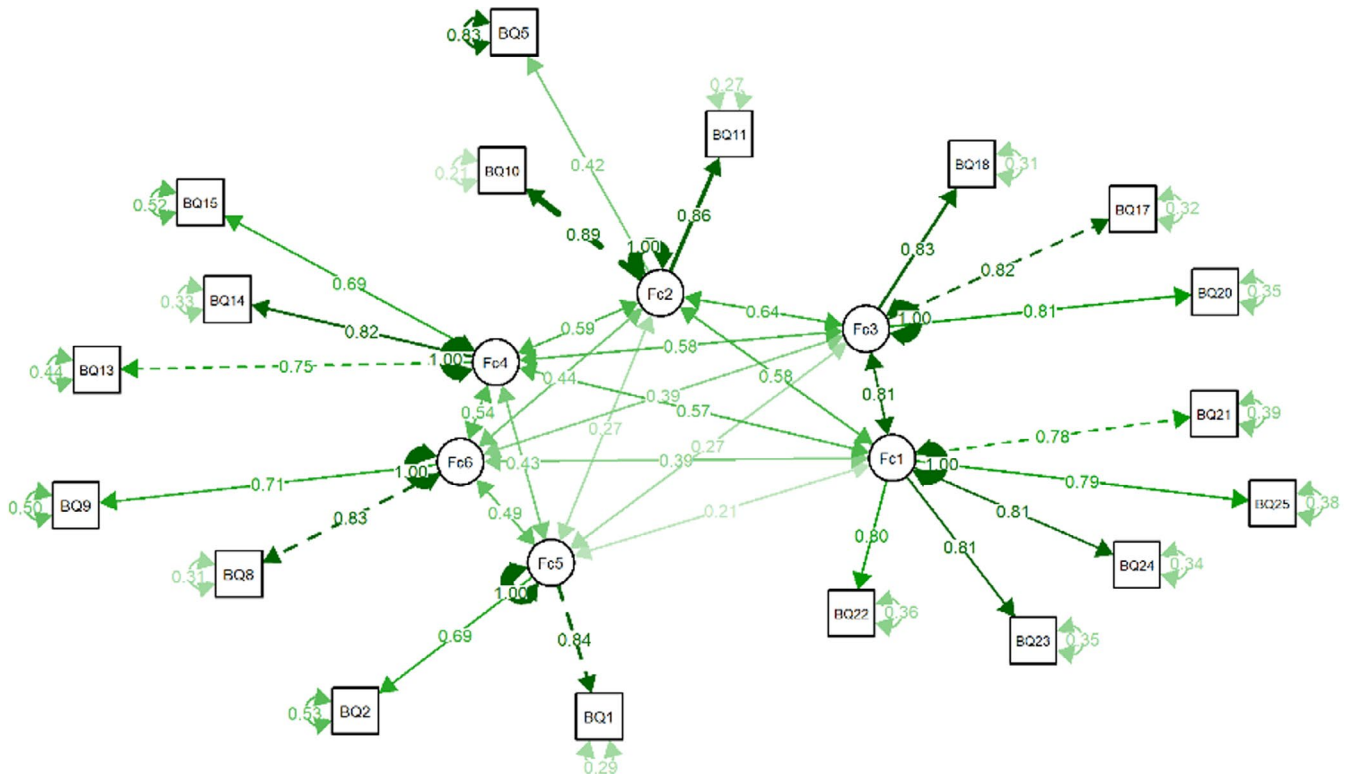
<sup>a</sup>5-point Likert scale, from 1 'never' to 5 'always' unfinished.

prioritization. For example, the time needed to administer medications or to record vital signs might be more accurately estimated because made up of a series of actions, as compared to the time needed to communicate with a patient and caregiver or to teach them how to self-care. These findings are consistent with the evidence available (Suhonen et al., 2018) confirming the idea that nurses have developed an informal hierarchical system, which they use for prioritizing the necessary nursing care when resources are too scarce.

The 21 items in part A retained after the stepwise selection concerned mostly nursing process as 'Assess the effectiveness of the care provided, for example reviewing if nursing care needs have been met' reflecting those intangible elements of caring such as critical thinking, decision-making or surveillance of patient progresses meant as core components of nursing interventions. Otherwise, some task-oriented items as 'Perform passive mobilization to bedridden patients' were removed from the tool. These tasks in the

Italian health care settings are quite often provided by NAs and therefore not under the direct execution of nurses (Palese, Ambrosi, et al., 2019; Palese, Bassi, et al., 2019): however, RNs are ultimate responsible, either by supervising or assessing the results of the intervention performed by NAs. Therefore, having introduced in part B a factor regarding issues on supervision of NAs should be considered a strength of the UNCS.

The final solution of the developed tool emerged as being capable of discriminating the unfinished nursing care as reported by senior (>10 year in the current unit) and less experienced nurses, thus suggesting the ability of detecting variations across nurses. The criterion validity measured by comparing the perceptions of nurses with those of NMs has mirrored the scarce evidence available in the field (Palese in press): higher occurrence is reported by NMs as compared to RNs, and this finding should be interpreted in the light of the limitations of this study.



**FIGURE 1** CFA path diagram of part B—Reasons for Unfinished Nursing Care. CFI = 0.929; TLI = 0.909; RMSEA = 0.075; SRMR = 0.045. CFA, confirmatory factor analysis; CFI, confirmatory factor index; Fc1, Factor 1 Communication; Fc2, Factor 2, Priority Setting; Fc3, Factor 3, Nurses' Aides supervision; Fc4, Factor 4, Material resources; Fc5, Factor 5, Human Resources, Fc6, Factor 6, Work flow predictability; TLI, Tucker Lewis index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square error [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

## 5.2 | Part B—reasons for Unfinished Nursing Care

Structural validity of part B—reasons for Unfinished Nursing Care, as assessed on a preliminary fashion with the EFA and then confirmed with the CFA, yielded a 18-item six-factor solution, three of them overlapping with the previous studies performed with the MISSCARE Survey ('Communication', 'Human resources' and 'Material resources', Kalisch & Williams, 2009), one similar to the fourth factor emerged from the analysis of the Italian MISSCARE ('Workflow predictability', Sist et al., 2017) and two completely new ('Priority setting' and 'NAs' supervision' issues) explaining 22.5% of the total variance (64.3%). Specifically, 'Priority setting' factor includes the 'Inadequate nursing care model (e.g. functional task-oriented model of care)', the 'Inaccurate initial priority setting' and the 'Inadequate priority re-assessment during the shift'. NAs' supervision factor is instead comprised of 'Nurse aides missed or delayed reporting of the tasks left undone', 'Inadequate supervision of the tasks assigned to the nurse aides' and 'Incomplete or interrupted communication between nursing staff and nurse aides/assistive personnel'. All these six items were newly added in the developed instrument apart from 'Incomplete or interrupted communication between nursing staff and nurse aides/assistive personnel'. Setting the priorities has already been highlighted as an element addressing

the lacks of care (Jones et al., 2015) suggesting the need to invest in these skills that are not formally acquired and mainly shaped by routines and habits on the units. On the other hand, supervising NAs is a complex process and might be more complex in such contexts where the skills mix is in their favour, thus with more NAs that RNs. Also in this context, coaching future nurses to assess issues in the supervision and addressing the process in a competent manner is suggested.

However, highlighting factors as perceived causes of unfinished care can provide a broader view of the phenomenon, a better understanding of the major barriers to the nursing care process, and above all, guide decisions on subsequent interventions.

## 5.3 | Study limitations

The study has several limitations. We have involved a convenience sample of RNs working only in medical and surgical settings, and this might have affected the findings as well as its generalizability. Moreover, in the process of tool development, we have considered on a preliminary basis the MISSCARE Survey according to its wide recognition worldwide, as well as to its validation and psychometric properties available also in Italian (Kalisch & Williams, 2009; Sist

**TABLE 4** Items included in part B—Reasons for Unfinished Nursing Care—descriptive findings

Number <sup>a</sup>	Items/Factors	N	Mean score <sup>b</sup>	Mean score CI 95%
Factor 1, Communication			2.36	2.31–2.40
21	Tension/conflicts within the nursing staff	1,313	2.59	2.53–2.65
22	Incomplete or interrupted communication among nursing staff	1,318	2.43	2.37–2.49
23	Tension/conflicts between nursing and medical staff	1,318	2.37	2.31–2.42
24	Incomplete or interrupted communication between nursing and medical staff	1,321	2.14	2.09–2.19
25	Lack of support/collaboration among team members	1,314	2.18	2.22–2.33
Factor 2, Priority setting			2.56	2.52–2.61
5	Inadequate nursing care model (e.g. functional task-oriented model of care)	1,303	2.63	2.58–2.69
10	Inaccurate initial priority setting	1,308	2.51	2.46–2.57
11	Inadequate priority re-assessment during the shift	1,305	2.54	2.49–2.59
Factor 3, Nurse Aides supervision			2.55	2.50–2.60
17	Nurse aides missed or delayed to report the tasks left undone	1,314	2.60	2.55–2.65
18	Inadequate supervision of the tasks assigned to the nurse aides	1,308	2.63	2.58–2.68
20	Incomplete or interrupted communication between nursing staff and nurse aides/assistive personnel	1,315	2.44	2.38–2.49
Factor 4, Material resources			2.31	2.27–2.35
13	Medications prescribed not available	1,318	2.06	2.01–2.11
14	Equipment not available/not functioning properly when needed	1,314	2.23	2.18–2.28
15	Other departments did not provide the service expected (e.g. delay in diagnostic processes)	1,312	2.45	2.40–2.50
Factor 5, Human resources			1.65	1.61–1.69
1	Inadequate number of nurses	1,322	1.71	1.66–1.76
2	Inadequate number of nurse aides	1,336	1.60	1.55–1.64
Factor 6, Work flow predictability			1.60	1.56–1.64
8	Unexpected rise in patient acuity	1,327	1.66	1.57–1.65
9	Heavy admission/discharge activity during the shift	1,327	1.60	1.55–1.64
Total			2.24	2.21–2.28

Abbreviations: CI, Confidence Interval.

<sup>a</sup>The number of items has been left to support in the understanding of the Confirmative Factors Analysis as reported in the Figure 1.

<sup>b</sup>5-point Likert scale, from 1 'not significant reason' to 5 'very significant reason'.

et al., 2017). Then, we have considered the BERNCA tool (Schubert et al., 2007) due to its psychometric validity measures available. We have instead excluded the Task Left Undone given that the majority of its items are included also in the MISSCARE Survey and BERNCA tools (Jones et al., 2015) and the fact that this tool is substantially a check list (Palese in press). Furthermore, measurement error, which has been also a property (Mokkink et al., 2010) evaluated in a few studies (Palese in press), was not considered in this study, as well as some reliability measures suggesting that future evaluations are needed, and some other important elements should be assessed as tool feasibility and management issues. In addition, given the absence of a gold standard in the field as established by a recent systematic review (Palese in press) the criterion validity was measured by confronting the NMs' perceptions and nurses' one. The NMs might develop a global vision of the care delivered in their unit, including that unfinished which

can be variable across shifts between nurses with different attitudes, performances and perceptions: future studies are recommended to establish strong criterion validity measures also in this field.

The initial attempt of researchers was to develop a tool more process-oriented rather than task-oriented, by emphasizing the processes (e.g. supervising nursing aides, involving patients and caregivers) instead of specific tasks (e.g. respond promptly to patients' calls, within five minutes, administer PRN medications within 15 min from the patient's request). The developed tool includes a mix of elements process- and task-oriented, suggesting that this line of investigation aimed at reflecting the complexity of nursing care in tools measuring unfinished nursing care should be continued. According to the aim of the study, any stratification of the findings has been provided, for example by public and private hospitals, confirming that future studies are needed.

## 6 | CONCLUSION

With the aim of improving the knowledge available in the measurement of nursing care failures by capitalizing the evidence available and intercepting elements not considered in previous instruments, according to the changes continuously occurred in the nursing practice, we have developed and validated a comprehensive tool reflecting the broader concept of Unfinished Nursing Care. Using the overarching concept of 'Unfinished nursing care', starting from the MISSCARE Survey validated in the Italian context, we attempted to collapse items included in other available tools in the field of rationing of nursing care and caring behaviour, by developing and validating a comprehensive tool. The emerged Unfinished Nursing Care Survey can be considered as starting the third generation of the tools in this field. The tool is composed of part A and Part B with, respectively, 21 and 18 items and, according to its psychometric properties, can be used for assessing the amount and the reasons of unfinished care. Its comprehensive nature can contribute to the establishment of a common reference measure of the phenomenon worldwide although its psychometric properties and as well as its feasibility need future investigation in different cultural contexts, languages and clinical settings.

## 7 | IMPLICATION FOR NURSING MANAGEMENT

Measuring unfinished nursing care can function as a proxy indicator of patient safety as it informs on the processes involved in the development of adverse events before these become visible, appreciable and measurable. Moreover, the tool developed can function as a proxy measure of the distance between the expected role and scope of practice of nurses and what is allowed in daily practice. Furthermore, by implementing the UNCS and collecting periodical measures, the NMs can use the data collected to inform decisions regarding strategies to ensure both patient safety and to promote enhancements in the quality of care.

Regarding the higher perception of unfinished nursing care among senior RNs, in line with previous studies (e.g. Palese et al., 2015), this suggests to consider the need for more organisational support to them in order to prevent their dissatisfaction in not being able to provide the care required. On the other hand, the higher perception of unfinished care among NMs as compared to clinical nurses suggests that managers have high expectations regarding the standard of care that should be provided. This can be a stimulus as they are engaged in a continuous process of development and also a source of great dissatisfaction because of the gap between the ideal care and that delivered. However, future studies should develop evidence regarding the value of the perceptions of NMs, for example by assessing if these are overestimated or not.

### ACKNOWLEDGEMENTS

The authors thank the expert colleagues Beatrice Albanesi, Elisa Ambrosi, Lucia Cadarin, Alessio Conti, Angela Durante, Dhurata

Ivziku, Irene Mansutti, Daniela Pirini, Debora Rosa and Simone Stevanin who collaborated on performing face and content validity and Alessandra Valentini for her contribution to the data analysis. The authors thank also the Nurse Directors of the participating hospitals, the contact persons Vittorio Artiola, Palmina Cavallo, Cristina Cerati, Giorgia Ciani, Marica Colombi, Lorella Fabbri, Emanuela Fioretti, Mariangela Fumagalli, Antonella Leto, Chiara Margottie, Carlo Orlandi and all the nurses who completed and returned the survey for their contribution to this research.

### CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

### AUTHOR CONTRIBUTION

EB, DT, GV, LG and AP made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content; and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. EB, GV and AP involved in drafting the manuscript or revising it critically for important intellectual content.

### ETHICAL APPROVAL

The Ethical Committee of Ferrara (Italy) approved the project (26/2017, on 17 February 2017). The informed consent of RNs and NMs was implied by the completion and return of the questionnaires. Confidentiality has been ensured at the individual, unit and hospital levels. Moreover, participation was on a voluntary basis and no rewards were offered.

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## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

**How to cite this article:** Bassi E, Tartaglini D, Valpiani G, Grassetti L, Palese A. Unfinished Nursing Care Survey: A development and validation study. *J Nurs Manag*. 2020;28: 2061–2071. <https://doi.org/10.1111/jonm.13170>