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# Occurrence and reasons for unfinished nursing care between COVID-19 and non-COVID-19 patients

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## Abstract

**Aim:** To compare the occurrence and the reasons for unfinished care among coronavirus disease (COVID-19) and non-COVID-19 patients as perceived by nurses.

**Background:** The recent pandemic has imposed tremendous changes in hospitals in all countries.

**Introduction:** Investigating the occurrence of and the reasons for unfinished care as perceived by nurses working in COVID-19 and non-COVID-19 units might help to gain insights and to address future pandemics.

**Methods:** A comparative cross-sectional study based on STROBE guideline has been performed from November 2020 to January 2021. The Unfinished Nursing Care Survey, comprising part A (elements) and part B (reasons), was administered online to all 479 nurses working in medical and surgical units converted progressively into COVID-19 and non-COVID-19 units. A total of 90 and 200 nurses participated, respectively.

**Results:** No differences in the unfinished care occurrence have emerged at the overall level between nurses caring for COVID (2.10 out of 5; 95% confidence interval [CI], 1.94–2.27) and non-COVID-19 patients (2.16; 95% CI, 2.06–2.26). Reasons for unfinished care reported significant higher averages among nurses caring for COVID (2.21; 95% CI, 2.10–2.31) as compared with those caring for non-COVID-19 patients (2.07; 95% CI, 2.01–2.14;  $p = 0.030$ ).

**Discussion:** The overall occurrence of unfinished care was slightly higher compared with pre-pandemic data in all patients.

**Conclusions:** Reasons triggering unfinished care were slightly different and were due to priority setting and human resources issues, which were perceived at higher significance among nurses working in COVID-19 compared with non-COVID-19 units.

**Implication for nursing and health policies:** A clear map of action has emerged that might be valid in the post-COVID-19 era as well as in the case of future pandemics.

## KEYWORDS

COVID-19 patients, instrument, Mokken scaling, unfinished nursing care

## INTRODUCTION

Unfinished nursing care (UNC) indicating aspects of the care required by patient that is omitted either in part or as a whole or postponed (e.g., Kalisch et al., 2009) has attracted huge professional and scientific interest in recent years. According to the evidence developed, elements of nursing care at risk of being missed have similarities across the world and

settings (Jones et al., 2015), resulting in some fundamental needs, such as oral care, ambulation, and emotional support as the most frequently omitted care (e.g., Griffiths et al., 2018). Among the reasons for these, similarities across settings and countries have also been reported: at the unit level, workforce and material resource shortages, intrateam communication, and working environment issues as well as the philosophy of care influencing internal values, beliefs, and habits (Kalisch

& Williams, 2009; Schubert et al., 2007) have been underlined to affect the occurrence of UNC. At the hospital and healthcare system levels, policies and values affecting priorities (Jones et al., 2020) have been reported to ultimately affect the occurrence of unfinished care at the bedside, threatening patient safety (Kalánková et al., 2020), as well as nurses' satisfaction and intention to remain in the profession (Dhaini et al., 2017). However, the evidence progressively accumulated to date in this field has concerned stable health services and professional systems (Papastavrou & Suhonen, 2021), or the services and systems under the pressure of the developmental changes triggered by reforms (Unger et al., 2020). Describing the occurrence and reasons for unfinished care as perceived by nurses during an outbreak, and comparing findings with the occurrence of UNC in settings not exposed to the unprecedented changes lived by the healthcare systems, might support nurse managers in designing anticipatory strategies that are required during infectious disease outbreaks (von Vogelsang et al., 2021).

## BACKGROUND

The recent pandemic of coronavirus disease (COVID-19) has imposed tremendous hospitals changes in all countries: the mission of the units (e.g., surgical and medical) has been progressively changed, devoting them to the care of COVID-19 patients. Teams have been rearranged by urgently recruiting newly qualified graduates, experts (e.g., Danielis et al., 2021), as well as nursing students by offering accelerated introduction programs, while the routines of the units have been disrupted (Cadge et al., 2021). Hospitals have addressed material, logistic, and human resources to deal with the pandemic, and the entire healthcare system has been changed in its priorities by suspending or postponing programmed procedures and by giving high priority to COVID-19 patients. Moreover, the suspension of hospital access by relatives has left patients' emotional needs completely in the hands of the healthcare workers (Ambrosi et al., 2020).

Several unplanned changes have been introduced during the first wave, which started in the Republic of China, and then reached Italy, which was the first European country (Ritchie et al., 2020) to be tremendously affected by the pandemic (Liu et al., 2020). More planned changes have been implemented in the second wave, which occurred in Italy from October 2020, in order to increase the capacity of the healthcare system. As a consequence of the continuous high priority given to COVID-19 patients, increased concerns regarding the missed care for other patients have been documented, along with its impact on healthcare inequalities (e.g., reduction of care delivered; Nash et al., 2020), patient safety, ethical issues, and new forms of global health insecurity (Šehović & Govender, 2021). However, only one study has been performed to date to measure the missed care occurring among COVID-19 and non-COVID-19 patients in Sweden (von Vogelsang et al., 2021). One hundred thirty nurses were involved during the first wave of the COVID-19 pandemic, and their perceptions were compared

with data collected in pre-pandemic times among 157 nurses in 2019. Few differences emerged regarding the elements of missed care, whereas no significant differences were documented regarding the missed care reasons, suggesting that during the outbreak the quality of care and the patient safety are also good (von Vogelsang et al., 2021).

## AIM OF STUDY

With the intent to learn from the profound crisis that all countries are living while dealing with the pandemic (Palese et al., 2021a), the aim of the study was to measure occurrence of and the reasons for UNC among COVID-19 and non-COVID-19 patients as perceived by nurses during the second wave.

## METHODS

### Design

A comparative cross-sectional study was performed from November 2020 to January 2021. The findings are here reported according to the Strengthening the Reporting of Observational Studies in Epidemiology checklist statement (Von Elm et al., 2007; Table S1).

### Setting

The study has been conducted in the Veneto region, north-east Italy, one of the hardest hit areas since the first wave. Two large healthcare trusts with their hospitals offering 1500 and 2175 beds, respectively, and serving around one million citizens were identified. As reported in Table S2, homogeneous strategies were implemented in the approached hospitals to face the increased cases that occurred in the second wave, which was initiated in the middle of October 2020. According to the research protocol (Di Falco et al., 2021), 22 units were identified, distributed equally between medical and surgical units. These units progressively changed their mission, resulting at the end of the study in 15 COVID-19 non-intensive patient units and in seven non-COVID-19 units caring for medical, geriatric, medical-surgical, and orthopedic patients. Nursing students did not attend their clinical placements during the study period.

### Participants

All registered nurses (RNs;  $N = 479$ ) working in the approached hospitals and settings on October 2020, just before the second wave, and willing to participate in the study, were eligible. These nurses were invited to participate in the study by sending them the link survey; the system refused some links (77; 16.1%) (as wrong emails) while 13 (2.7%) RNs refused to participate.

## Data collection instruments and methods

The Unfinished Nursing Care Survey (UNCS; Bassi et al., 2020) was used, which is composed of two sections:

1. Part A (elements of UNC): The scalability coefficient for each item ( $H_i$ ) was assessed, and a strong scalability ( $H = 0.52$ ) emerged. All 38 elements of the UNC were included in the tool, and participants were asked to respond based on a 5-point Likert scale, ranging from 1 “never” to 5 “always unfinished.” “Not applicable in my patients/setting” was also a possible option.
2. Part B (reasons for UNC) in the following six factors: “Communication” (5 items,  $\alpha 0.890$ ); “priority setting” (3 items,  $\alpha 0.755$ ); “nurses’ aides supervision” (4 items,  $\alpha 0.853$ ); “material resources” (3 items,  $\alpha 0.766$ ); “human resources” (2 items,  $\alpha 0.734$ ); and “workflow predictability” (2 items,  $\alpha 0.732$ ). Participants were asked to answer using a 5-point Likert scale, ranging from 1 “not a significant” to 5 “a very significant reason.”

The UNCS was accompanied by questions exploring the demographic and professional background. Information regarding the study aims and procedures was ensured with an online meeting where all nurse managers and eligible RNs were invited. Then, written information was provided at the unit level and in the online link, where written consent was requested before the questionnaire display. Three email reminders were issued during the period. In Table S3, strategies implemented to prevent bias are summarized.

## Data analysis

Questionnaires were checked for their completeness: a total of 22 (7.5%) reported some missed items in the demographic/professional section, 96 (33.1%) reported elements of nursing care “Not applicable in my patients/setting” (part A), while no missing items emerged in part B. Given the explorative nature of the study, and the high completeness of answers according to the literature on online research surveys (Kongsved et al., 2007), all questionnaires were retained. For each variable under investigation, the precise answers obtained have been reported in the tables.

Categorical variables have been summarized in frequencies and percentages, whereas averages and 95% CI were calculated in the case of continuous variables. The reliability of the UNCS scale part A was measured using the Molenaar Sijtsma Rho coefficient (acceptable values  $\geq 0.7$ ; van der Ark, 2012). In both subsamples (COVID19 and non-COVID19 data), the reliability was high ( $> 0.95$ ). An automated item selection procedure assessed the unidimensionality of part A up to a lower bound of 0.35. By computing the Loevinger H-coefficient (scalability), the goodness of fit of the model was also assessed by considering the findings as following: weak if  $0.3 \leq H < 0.4$ , moderate if  $0.4 \leq H < 0.5$ , and strong if  $H > 0.5$ . In our sample, the HT values were 0.496 (standard error [SE]

0.042) and 0.568 (SE 0.063) for non-COVID-19 and COVID-19 data, respectively. In both cases, the result was better than that obtained with the full data set (HT = 0.495), and the  $H_i$  ranges from 0.380 to 0.703 and from 0.377 to 0.604, respectively. Thus, given the small sample size, we set up the algorithm to lead to four rest-score groups (Stochl et al., 2012). Both monotonicity and invariant item ordering (IIO) were assessed considering this suggestion. With such a setting, the automatic procedures suggested minimal data reduction (4 and 5 items must be removed): notwithstanding, we decided to keep the whole set of items aiming to directly compare the two groups of observations. The part B factor structure was also assessed by performing a confirmative factor analysis (data available from the authors).

The IBM SPSS Statistics (version 26.00) and the R software (R Core Team, 2020) for MSA (Mokken package, van der Ark, 2012) were used to perform the analysis. In all analyses,  $p < 0.05$  was set as statistically significant.

## Ethical issues

The research protocol was approved by the Ethical Committee of the Verona Teaching Hospital (CESC Prot. n. 3875 del 21/01/2020, Prog. 2443CESC) and of the Azienda ULSS 9 Scaligera (September 23, 2020, and October 1, 2020, prot. N. 776). Confidentiality of the data collected was ensured at the nurse, unit, and hospital levels.

## RESULTS

### Participants

A total of 90 nurses caring for COVID-19 and 200 caring for non-COVID-19 patients participated. In all demographic and professional variables (Table 1), nurses were homogeneous with the exception of education achieved at Bachelor levels, which was significantly more among those nurses caring for non-COVID-19 (56.3% vs 72.2%,  $p = 0.009$ ) compared with those caring for COVID-19 patients. Moreover, fewer nurses were working full time in COVID-19 than in non-COVID-19 units (70.0% vs. 85.0%,  $p = 0.001$ ), and they reported to have cared for more significant discharges (1.5; 95% CI, 1.0–2.0 vs. 0.9; 95% CI, 0.6–1.1;  $p = 0.028$ ). Furthermore, nurses working in COVID-19 units perceived a higher nurses’ aides (75% of the time: 41.1% vs. 37.5%,  $p = 0.012$ ) and nursing staff adequacy (75% of the time: 45.6% vs 37.0%,  $p = 0.053$ ), compared to those who were working in non-COVID-19 units.

### Unfinished care occurrence and prioritization

All 38 elements included in the UNCS have emerged as appropriate (Table 2) according to the  $H_i$  indexes (ranging from 0.375 [SE 0.129], “Collect data on the situation of patients

TABLE 1 Nurses' profile working with COVID-19 (n = 90) and non-COVID-19 (n = 200) patients

Individual and professional variables (number of respondents)	COVID-19 (n = 90) N (%)	Non-COVID-19 (n = 190) N (%)	p value
<b>Gender, female</b> (90, 200)	80 (88.9)	169 (84.5)	0.321
<b>Age, years, average (95% CI)</b> (90, 200)	40.1 (37.8–42.3)	37.7 (36.2–39.2)	0.085
<b>Nursing education</b> (87, 190)			
Nursing diploma	38 (43.6)	53 (27.8)	0.009
Bachelor in nursing	49 (56.3)	137 (72.2)	
Specialization, master in nursing science	10 (11.4)	20 (10.5)	0.608
<b>Experience as a nurse, years, average (95% CI)</b> (90, 200)	16.1 (13.7–18.6)	13.5 (11.9–15.1)	0.075
<b>Experience as a nurse, in this unit, years, average (95% CI)</b> (0, 200)	5.0 (3.6–4.9)	6.0 (4.9–7.1)	0.275
<b>Working profile</b> (90, 200)			0.001
Full-time	63 (70.0)	170 (85.0)	
Part-time, 30 hours/week	5 (5.6)	11 (5.5)	
Part-time, 24 hours/week	18 (20.0)	11 (5.5)	
Part-time, 18 hours/week	3 (1.5)	3 (1.5)	
Other	5 (2.5)	5 (2.5)	
<b>Shift profile</b> (90, 200)			0.248
Mornings, afternoons, nights	84 (93.3)	178 (89.0)	
Only mornings and afternoons (no nights)	6 (6.7)	22 (11.0)	
<b>Shifts schedules: changes occurred urgently last month</b> (89, 200)			0.202
None	28 (31.1)	61 (30.5)	
From 1 to 2 shifts	48 (53.3)	93 (46.5)	
From 3 to 4 shifts	9 (10.0)	38 (19.0)	
> 5 shifts	4 (4.4)	8 (4.0)	
<b>Extra working hours, last 3 months, average (95% CI)</b> (88, 187)	24.0 (17.6–30.5)	21.0 (5.17.2–24.8)	0.429
<b>Absences due to health reasons in the last 3 months</b> (89, 199)			0.959
None	51 (62.2)	119 (65.4)	
1 day	5 (6.1)	11 (6.0)	
2–3 days	11 (13.4)	23 (12.6)	
4–6 days	7 (8.5)	11 (6.0)	
> 6 days	8 (9.8)	18 (9.9)	
<b>Last shift</b>			
<b>Patients cared for, average (95% CI)</b>	11.4 (10.4–12.3)	11.1 (10.5–11.7)	0.694
<b>Newly admitted, average (95% CI)</b>	1.9 (1.2–2.5)	1.4 (1.0–1.7)	0.209
<b>Discharged, average (95% CI)</b>	1.5 (1.0–2.0)	0.9 (0.6–1.1)	0.028
<b>Perceived adequacy of the nurses' aides of the unit</b> (89, 200)			0.012
100% of the time	13 (4.4)	14 (7.0)	
75% of the time	37 (41.1)	69 (37.5)	
50% of the time	24 (26.7)	76 (38.0)	
25% of the time	13 (14.4)	34 (17.0)	
0% of the time	2 (2.2)	17 (8.5)	
<b>Perceived adequacy of the nursing staff of the unit</b> (90, 200)			0.053
100% of the time	8 (8.9)	7 (3.5)	
75% of the time	41 (45.6)	74 (37.0)	
50% of the time	27 (30.0)	82 (41.0)	
25% of the time	14 (15.6)	31 (15.5)	
0% of the time	8 (8.9)	6 (3.0)	
<b>Intention to leave the unit</b> (90, 199)			0.256
No	54 (60.0)	100 (50.0)	
Yes, in the next 6 months	24 (26.7)	55 (27.5)	
Yes, in the next 12 months	12 (13.3)	44 (22.0)	

(Continues)

TABLE 1 (Continued)

Individual and professional variables (number of respondents)	COVID-19 ( <i>n</i> = 90) <i>N</i> (%)	Non-COVID-19 ( <i>n</i> = 190) <i>N</i> (%)	<i>p</i> value
<b>Satisfaction as a nurse</b> (90, 200)			0.281
Very satisfied	19 (21.1)	48 (24.0)	
Satisfied	50 (55.6)	89 (44.5)	
Neither satisfied nor dissatisfied	13 (14.4)	45 (22.5)	
Very dissatisfied	8 (8.9)	18 (9.0)	
<b>Satisfaction in the current role</b> (90, 200)			0.821
Very satisfied	11 (12.2)	24 (12.0)	
Satisfied	47 (52.2)	98 (49.0)	
Neither satisfied nor dissatisfied	23 (25.6)	50 (25.0)	
Very dissatisfied	9 (10.0)	28 (14.0)	
<b>Satisfaction with the teamwork</b> (90, 200)			0.363
Very satisfied	13 (14.4)	24 (12.0)	
Satisfied	48 (53.3)	95 (47.5)	
Neither satisfied nor dissatisfied	18 (20.0)	60 (30)	
Very dissatisfied	11 (12.2)	21 (10.5)	

CI, confidence interval; COVID-19, coronavirus disease 2019.

at the beginning of the shift,” to 0.703 [SE 0.097], “Perform bedside glucose monitoring as prescribed”) among nurses caring for COVID-19 patients and with similar findings (from 0.377 [SE 0.072] to 0.557 [SE 0.075], respectively) among those who cared for non-COVID-19 patients. However, a few of them have been considered not applicable to their patients or setting by participants (Table S4) with only three significant differences between groups: “Providing clinical teaching to nursing students” (nurses caring for COVID-19 patients = 11; 12.2% vs. non-COVID-19 = 4; 2%  $p \leq 0.001$ ); “Providing mouth care to patients who need it” (0, 0% vs. 9, 4.5%;  $p = 0.041$ ); and “Monitoring intake/output” (4, 4.4% vs. 24, 12%;  $p = 0.044$ ).

As reported in Table 2, no differences in the UNC occurrence have emerged at the overall level between nurses caring for COVID-19 (2.10 out of 5; 95% CI, 1.94–2.27) and non-COVID-19 patients (2.16; 95% CI, 2.06–2.26). Unfinished elements ranged from never missed (“Perform bedside glucose monitoring as prescribed”) without any statistical differences between groups (COVID-19: 1.38, 95% CI, 1.19–1.57 vs. non-COVID-19 units: 1.35, 95% CI, 1.23–1.46) to more than occasionally unfinished (“Help patients in need in ambulation,” 3.07, 95% CI, 2.80–3.34 vs. 3.19, 95% CI, 3.01–3.37, respectively). However, only one element out of the 38 has been reported to be missed significantly less often in among COVID-19 compared with non-COVID-19 patients, namely, “Administering medication within 30 minutes of the time prescribed” (2.32, 95% CI, 2.08–2.56 vs. 2.72, 95% CI, 2.56–2.88;  $p = 0.006$ ).

The scalability of the UNCS part A between groups (COVID-19,  $H = 0.515$  vs. non-COVID-19,  $H = 0.486$ ) was strong and moderate, respectively. Moreover (Table 2), the order of some priorities was different, such as “Providing personal hygiene to patients who need it” (the fourth priority among nurses working in COVID-19 units vs. the 10th), “Helping patients who are unable to eat independently and/or

have clinical problems” (16th vs. 21st), and “Ensuring the comfort of the patients” (23.5th vs. 27th).

### Reasons for unfinished care

At the overall level as reported in Table 3, reasons measured with the UNCS part B obtained a significant higher average among nurses caring for COVID-19 (2.21, 95% CI, 2.10–2.31) compared with those caring for non-COVID-19 patients (2.07, 95% CI, 2.01–2.14), ( $p = 0.030$ ). Homogeneously between groups, the most significant unfinished care reason was issues in the “priority setting” (nurses caring for COVID-19 average 2.78 out of 5, 95% CI, 2.63–2.93 vs non-COVID-19 patients 2.60, 95% CI, 2.51–2.70), while the least significant was the “workflow predictability” (1.60, 95% CI, 1.47–1.73 vs. 1.50, 95% CI, 1.42–1.58). However, a statistical difference only emerged between groups in the “priority setting” and in “human resources” factors ( $p = 0.049$ ,  $p = 0.007$ , respectively), with higher scores among nurses caring for COVID-19 patients.

## DISCUSSION

### Participants

To our best knowledge, this is the first study comparing the occurrence and reasons of unfinished care between COVID-19 and non-COVID-19 units as perceived by nurses exposed to the same system pressure (Jones et al., 2020). Recently, von Vogelsang et al. (2021) have compared data collected during the first pandemic wave with those of 2019 under different system conditions.

Participants’ profile was similar to that documented in available studies on missed care in the Italian context (e.g., Sist et al., 2017). Moreover, the profile was homogeneous between



**TABLE 2** Unfinished nursing care as perceived by nurses caring for COVID-19 ( $n = 90$ ) and non-COVID-19 ( $n = 200$ ) patients and prioritization

Unfinished elements (number of respondents)	COVID-19				Non-COVID-19			
	COVID-19 average (95% CI)	Non-COVID-19 average (95% CI)	p-value	H <sub>i</sub> (SE)	Priority	H <sub>i</sub> (SE)	Priority	Priority
14 Perform bedside glucose monitoring as prescribed (90, 200)	1.38 (1.19–1.57)	1.35 (1.23–1.46)	0.756	0.703 (0.097)	1	0.557 (0.075)	1	1
37 Perform clinical handover to adequately inform the next shift nursing team about patients' conditions (90, 199)	1.40 (1.21–1.59)	1.44 (1.33–1.56)	0.693	0.625 (0.091)	2	0.480 (0.072)	2	2
16 Record vital signs as planned (90, 193)	1.43 (1.24–1.63)	1.54 (1.41–1.67)	0.349	0.617 (0.101)	3	0.552 (0.064)	3	3
10 Provide personal hygiene to patients who need it (90, 199)	1.57 (1.36–1.77)	1.77 (1.63–1.91)	0.107	0.542 (0.107)	4	0.466 (0.059)	4	10
15 Monitoring intake/output (86, 180)	1.56 (1.36–1.76)	1.77 (1.60–1.93)	0.134	0.543 (0.096)	5	0.476 (0.063)	5	6.5
32 Prevent healthcare associated infections adopting good clinical practice (e.g., hand hygiene between patients) (90, 199)	1.63 (1.44–1.83)	1.69 (1.56–1.82)	0.610	0.637 (0.079)	6	0.516 (0.060)	6	4
21 Monitor pain as planned (90, 199)	1.63 (1.42–1.85)	1.75 (1.62–1.89)	0.336	0.633 (0.081)	7	0.510 (0.063)	7	6.5
1 Collect data on the situation of the patients' care at the beginning of the shift, through the handover (90, 198)	1.69 (1.46–1.92)	1.66 (1.52–1.80)	0.804	0.375 (0.129)	8.5	0.377 (0.072)	8.5	5
30 Ensure intensive surveillance, reevaluating, those patients who are unstable or who present a risk of deteriorating conditions (90, 197)	1.62 (1.43–1.81)	1.82 (1.67–1.96)	0.123	0.583 (0.094)	8.5	0.576 (0.048)	8.5	9
13 Check pressure ulcers and change dressing according to protocols (89, 196)	1.76 (1.55–1.98)	2.01 (1.87–2.15)	0.058	0.605 (0.080)	10	0.542 (0.052)	10	13
38 Provide clinical teaching to nursing students (79, 196)	1.85 (1.59–2.11)	1.73 (1.61–1.86)	0.393	0.585 (0.089)	11	0.436 (0.064)	11	8
31 Prevent negative outcomes for patients at risk (e.g., falls, pressure ulcers, and malnutrition (89, 197)	1.92 (1.71–2.13)	2.06 (1.93–2.19)	0.265	0.697 (0.057)	12	0.604 (0.044)	12	14
12 Perform physical assessment (e.g., skin integrity and invasive device insertion site) (90, 199)	1.94 (1.73–2.16)	2.08 (1.94–2.21)	0.307	0.575 (0.074)	13	0.516 (0.055)	13	15
18 Administer PRN medications within 15 min from the patient's request (90, 200)	1.91 (1.70–2.11)	1.93 (1.79–2.06)	0.877	0.568 (0.081)	14	0.540 (0.051)	14	12
19 Monitor administered medications effects (90, 200)	1.96 (1.73–2.18)	2.00 (1.85–2.14)	0.768	0.605 (0.076)	15	0.536 (0.057)	15	11
7 Helping patients who are unable to eat independently and/or have clinical problems (e.g., dysphagia) (90, 93)	1.96 (1.71–2.20)	2.19 (2.02–2.36)	0.126	0.460 (0.088)	16	0.428 (0.049)	16	21
29 Go to the patients at the bedside without being called (90, 199)	2.44 (2.22–2.67)	2.59 (2.44–2.77)	0.274	0.566 (0.075)	17	0.400 (0.057)	17	18
36 Fill in/update the clinical documentation/care plan in a comprehensive way (90, 198)	2.04 (1.82–2.27)	2.13 (1.98–2.28)	0.524	0.564 (0.067)	18	0.469 (0.054)	18	16
8 Helping patients who are unable to drink independently and/or have clinical problems (90, 198)	2.11 (1.87–2.35)	2.12 (1.96–2.27)	0.972	0.535 (0.077)	19	0.507 (0.045)	19	17
17 Administer medications within 30 minutes of the time indicated in the prescription (90, 200)	2.32 (2.08–2.56)	2.72 (2.56–2.88)	0.006	0.512 (0.089)	20	0.450 (0.052)	20	31.5

(Continues)

TABLE 2 (Continued)

Unfinished elements (number of respondents)	COVID-19			Non-COVID-19		
	COVID-19 average (95% CI)	p-value	H <sub>i</sub> (SE)	Non-COVID-19 average (95% CI)	Priority	H <sub>i</sub> (SE)
27 Teach patients and carers how to self-care at home (86, 190)	2.22 (1.94–2.50)	0.308	0.599 (0.066)	2.38 (2.21–2.56)	21	0.527 (0.044)
3 Document properly the interventions provided and revise the care plan (88, 191)	2.26 (2.01–2.51)	0.704	0.526 (0.072)	2.20 (2.04–2.37)	22	0.451 (0.056)
20 Ensure patients' comfort (microclimate, patient positioning) (90, 197)	2.34 (2.10–2.59)	0.821	0.634 (0.055)	2.38 (2.23–2.52)	23.5	0.589 (0.041)
35 Assess the effectiveness of the care provided, for example, reviewing if nursing care needs have been met (90, 199)	2.31 (2.07–2.55)	0.796	0.604 (0.058)	2.35 (2.20–2.50)	23.5	0.518 (0.053)
26 Involve patients and carers in the discharge planning (84, 188)	2.38 (2.09–2.67)	0.964	0.558 (0.068)	2.39 (2.22–2.56)	25	0.500 (0.049)
9 To stimulate the patient to maintain/improve his/her independence (90, 197)	2.37 (2.13–2.60)	0.978	0.564 (0.070)	2.37 (2.21–2.53)	26	0.494 (0.051)
24 Inform patients and their caregivers regarding the nursing care they are receiving (89, 191)	2.37 (2.12–2.62)	0.870	0.596 (0.055)	2.35 (2.18–2.52)	27	0.512 (0.050)
28 Respond promptly to patients' calls (within 5 min) (90, 200)	1.99 (1.75–2.22)	0.192	0.572 (0.059)	2.17 (2.02–2.31)	28.5	0.522 (0.045)
34 Supervise the tasks assigned to the nurse aides (90, 195)	2.50 (2.25–2.75)	0.224	0.556 (0.062)	2.68 (2.52–2.85)	28.5	0.525 (0.045)
2 Perform a round at the beginning of the shift to know the patients, present themselves, and deepen their situation (84, 179)	2.48 (2.17–2.78)	0.186	0.488 (0.069)	2.72 (2.52–2.93)	30	0.386 (0.061)
25 Emotionally support patients and carers by listening to their needs/concerns (89, 196)	2.54 (2.28–2.80)	0.675	0.645 (0.054)	2.60 (2.44–2.76)	31	0.552 (0.045)
23 Communicate with patients and carers (89, 197)	2.55 (2.31–2.79)	0.560	0.617 (0.058)	2.63 (2.48–2.79)	32.5	0.542 (0.047)
33 Discuss with physicians and other staff members the problems and interventions needed by patients (89, 193)	2.42 (2.14–2.69)	0.522	0.484 (0.060)	2.32 (2.15–2.48)	32.5	0.492 (0.052)
5 Help patients who need it to get in the chair	2.63 (2.42–2.84)	0.543	0.527 (0.078)	2.71 (2.56–2.86)	34	0.527 (0.048)
22 Spend time with patients and their carers (90, 194)	2.87 (2.62–3.12)	0.783	0.616 (0.054)	2.91 (2.75–3.07)	35	0.542 (0.046)
11 Provide mouth care to patients who need it (90, 191)	2.79 (2.53–3.05)	0.522	0.530 (0.064)	2.88 (2.72–3.05)	36	0.477 (0.047)
6 Passive mobilization/changing position in bedrest patient (87, 189)	3.08 (2.80–3.36)	0.869	0.487 (0.052)	3.05 (2.87–3.24)	37	0.421 (0.053)
4 Help patients in need in ambulation (88, 190)	3.07 (2.80–3.34)	0.457	0.573 (0.066)	3.19 (3.01–3.37)	38	0.442 (0.056)
<b>Total</b>	<b>2.10 (1.94–2.27)</b>	<b>0.540</b>	<b>H 0.057</b>	<b>2.16 (2.06–2.26)</b>	<b>H 0.057</b>	<b>0.032</b>
			<b>0.515</b>			<b>0.486</b>

Note: COVID-19: MS = 0.970; alpha = 0.968; lambda = 0.970; non-COVID-19 = MS = 0.968; alpha = 0.965; lambda = 0.967. CI, confidence interval; COVID-19, coronavirus disease 2019; H<sub>i</sub>, scalability; H<sub>i</sub>, single-item scalability; HT, mean distance between scale items; PRN, pro re nata (as needed); Rho, scale reliability; SE, standard error. Likert: "never" unfinished (1), "rarely" (2), "occasionally" (3), "very frequently" (4), "always" unfinished (5).



**TABLE 3** Reasons of unfinished nursing care as perceived by nurses caring by for COVID-19 ( $n = 90$ ) and non-COVID-19 ( $n = 200$ ) patients

Reasons <sup>a</sup>	COVID-19 Average (95% CI)	Non-COVID-19 Average (95% CI)	p-value
<b>Factor 1, Communication</b> (90, 200)	<b>2.40 (2.23–2.56)</b>	<b>2.35 (2.25–2.45)</b>	<b>0.640</b>
Tension/conflicts within the nursing staff	2.84 (2.63–3.06)	2.81 (2.68–2.94)	0.779
Incomplete or interrupted communication among nursing staff	2.53 (2.33–2.74)	2.38 (2.25–2.52)	0.240
Tension/conflicts between nursing and medical staff	2.37 (2.18–2.55)	2.40 (2.27–2.53)	0.775
Incomplete or interrupted communication between nursing and medical staff	2.11 (1.91–2.31)	1.97 (1.84–2.09)	0.221
Lack of support/collaboration among team members	2.16 (1.95–2.36)	2.23 (2.10–2.36)	0.535
<b>Factor 2, Priority setting</b> (90, 200)	<b>2.78 (2.63–2.93)</b>	<b>2.60 (2.51–2.70)</b>	<b>0.049</b>
Inadequate nursing care model (e.g., functional task-oriented model of care)	2.79 (2.60–2.98)	2.50 (2.36–2.63)	0.016
Inaccurate initial priority setting	2.84 (2.65–3.04)	2.63 (2.51–2.75)	0.054
Inadequate priority reassessment during the shift	2.71 (2.53–2.89)	2.70 (2.59–2.80)	0.876
<b>Factor 3, Nurses' aide supervision</b> (90, 200)	<b>2.51 (2.35–2.68)</b>	<b>2.43 (2.32–2.54)</b>	<b>0.418</b>
Nurse aides missed or delayed reporting the tasks left undone	2.56 (2.37–2.74)	2.46 (2.34–2.58)	0.402
Inadequate supervision of the tasks assigned to the nurse aides	2.56 (2.37–2.74)	2.53 (2.40–2.65)	0.786
Incomplete or interrupted communication between nursing staff and nurse aides/assistive personnel	2.44 (2.25–2.64)	2.33 (2.19–2.46)	0.323
<b>Factor 4, Material resources</b> (90, 200)	<b>2.19 (2.03–2.35)</b>	<b>2.02 (1.93–2.11)</b>	<b>0.058</b>
Other departments did not provide the service expected (e.g., delay in diagnostic processes)	2.47 (2.29–2.64)	2.33 (2.21–2.44)	0.177
Medications prescribed not available	2.10 (1.92–2.28)	1.92 (1.80–2.03)	0.086
Equipment not available/not functioning properly when needed	2.01 (1.81–2.22)	1.83 (1.71–1.95)	0.108
<b>Factor 5, Human resources</b> (90, 200)	<b>1.76 (1.62–1.89)</b>	<b>1.53 (1.44–1.62)</b>	<b>0.007</b>
Inadequate number of nurses	1.64 (1.49–1.80)	1.49 (1.39–1.59)	0.094
Inadequate number of nurse aides	1.88 (1.70–2.06)	1.58 (1.47–1.69)	0.003
<b>Factor 6, Workflow predictability</b> (90, 200)	<b>1.60 (1.47–1.73)</b>	<b>1.50 (1.42–1.58)</b>	<b>0.180</b>
Unexpected rise in patient acuity	1.64 (1.48–1.81)	1.50 (1.40–1.59)	0.098
Heavy admission/discharge activity during the shift	1.57 (1.43–1.70)	1.52 (1.42–1.61)	0.554
<b>Total</b>	<b>2.21 (2.10–2.31)</b>	<b>2.07 (2.01–2.14)</b>	<b>0.030</b>

CI, confidence interval.

<sup>a</sup>“not a significant reason” (1); “a significant reason” (5).

COVID-19 and non-COVID19 units, suggesting that experienced nurses have been involved in the care of COVID-19 patients, whereas other countries have also involved newly qualified graduates and nursing students (e.g., Casafont et al., 2021). Although the competencies required by COVID-19 patients have been developed mainly in the field (Ambrosi et al., 2020), the healthcare organizations involved in our study seem to have ensured expert nurses in both groups of patients without distinction.

Only three variables were significantly different between nurses working with COVID-19 and non-COVID-19 patients: those working with COVID-19 patients were more often part-time nurses, and this might be due to the attempt of the nurse managers to prevent the poor comfort consequent to the personal protective equipment (PPE) worn by them, by reducing the exposure time. Moreover, although the number of patients

cared for was homogeneous (in the ratio of 1 nurse for 11 patients), a higher number of discharges were reported in the COVID-19 units; those working with COVID-19 patients perceived the adequacy of nurses' aides and nursing staff significantly more often. Nurses working with COVID-19 patients might have been better supported by nurse managers, thus reporting a perception of working in a context with more adequate staff resources. The study was conducted in the initial phase of the second wave, after a normalized period occurred during the previous summer, which might have helped nurses to recover from the stress. In this context, the number of days off due to health issues, as well as the number of extra hours worked, were not only homogeneous between groups but also slightly inferior when compared to previous Italian studies (Palese et al., 2015). Therefore, individual resources in addition to the support received by nurse managers might have

mitigated the stress documented in the first wave (e.g., Mo et al., 2020) by rendering the nursing system more prepared to deal with the pandemic (Lee et al., 2021).

### Unfinished care occurrence and prioritization

First, we used the UNCS (Bassi et al., 2020) with all 38 elements of care: not all of these were applicable in the daily care by nurses, and differences emerged in the clinical teaching of students—given that they were not allowed to attend clinical rotations in COVID-19 settings, or in the mouth care and in monitoring intake/output, which, more often among non-COVID-19 units, have been perceived as not being needed. As a consequence, the set of nursing care elements were all appropriate and applicable with slight differences likely due to the different clinical issues of COVID-19 and non-COVID-19 patients.

At the overall level, no differences in the unfinished care occurrence emerged between COVID-19 and non-COVID-19 units as perceived by nurses. According to the findings, it seems that patients are at the same risk of receiving unfinished care: only in “Administering medication within 30 minutes of the time prescribed” was the occurrence higher among non-COVID-19 patients (2.72 vs 2.32): however, the clinical relevance of the difference that emerged seems to be limited.

Moreover, the overall occurrence emerged in our study (2.10 and 2.16 among COVID-19 and non-COVID-19 units, respectively) was slightly higher when compared with previous studies (e.g., mean score 2.07 in Bassi et al., 2020). Similar findings also emerged in the analysis of specific items (e.g., in our study: “Provide mouth care to patients who need it” 2.79 and 2.88 among COVID-19 and non-COVID-19 units; vs. 2.67 as reported in Bassi et al., 2020). Findings suggest an increased perception of missed care among nurses in times of the COVID-19 pandemic—second wave. In contrast, von Vogelsang et al. (2021) documented no differences in Sweden during the first wave compared with previous data, concluding that the quality of care and patient safety were perceived as good under both conditions.

The slightly increased occurrence that emerged in our study might be due to different factors—such as the absence of family support due to restrictions in hospital visits, thus limiting their contribution to nursing care, the increased intensity of workloads imposed by the second wave, the complexity of care required by COVID-19 patients, and the revised care processes and layout of units for non-COVID-19 patients (Joo & Liu, 2021). Hospitals have been profoundly revised in their structure and processes of care—and this might have increased the complexity of workflows across the board (Santos et al., 2021). However, clinical effects of the higher occurrence of unfinished emerged care might differ between patients: for example, active and passive mobilization, which have emerged as more than occasionally unfinished, have been reported to be crucial among COVID-19 patients, given that they trigger immunomodulatory effects, modulate inflammation, stimulate nitric oxide synthesis path-

ways, controlling over oxidative stress (Fernández-Lázaro et al., 2020).

Different priorities have emerged, suggesting that nurses caring for COVID-19 patients seem to be more focused on the fundamental needs (Kitson et al., 2014), giving higher priority to personal hygiene, eating, comfort, and a timely administration of medication; on the other hand, nurses working with non-COVID-19 patients give higher priority to “Discuss with physicians and other staff members the problems and interventions needed by patients.” Different models of care delivery, and nurses’ aides supporting them, as well as the complete dependence and isolation of patients, might trigger these different priorities; however, underlying reasons given for different priorities merit further analysis.

Communicating with patients and ensuring emotional support have been reported in both groups as being low priority, as shown in previous studies (e.g., Griffiths et al., 2018). The higher need for communication and support in times of increased solitude of patients due to isolation, and hospital policies avoiding relatives’ visits, did not substantially change the priority of these needs that remain at a lower level. On the one hand, new solutions implemented in hospitals (e.g., video calls) might have provided a surrogate satisfaction of these needs; on the other hand, the PPE worn by nurses in COVID-19 units and the need to prevent contact in non-COVID-19 units might have minimized contacts and the importance attributed to emotional care, an aspect that should be analyzed further.

### Reasons for unfinished care

At the overall level, nurses working with COVID-19 patients reported a significant higher average of scores on reasons included in the UNCS tool (2.21 out of 5) compared with their colleagues (2.07), which resulted—as reported above—in a similar amount of unfinished care occurrence. Although the practical relevance of the difference seems to be limited, the support received by COVID-19 units might have mitigated the effects of such reasons perceived at higher significance. Moreover, the findings that emerged reflect the evidence available (Bassi et al., 2020) in the averages of each factor, suggesting that despite unprecedented circumstances lived, missed care is due to the reasons already known (Papastavrou & Suhonen, 2021).

Only “priority setting” and “human resources” issues reported significantly higher averages among nurses working in COVID-19 than in non-COVID-19 units; however, in this case, the practical relevance of the difference seems to be limited. However, surprisingly, in both groups of nurses, “work-flow unpredictability” and “human resources” have been ranked at the lowest significance: a pandemic is characterized by multiple changes in the care processes and a dramatic increased demand of services. The managerial support perceived by both groups of nurses might have mitigated these issues. Moreover, “communication,” “priority setting,” and “nursing aides’ supervision” have been reported in descend-



ing order, respectively, as the more significant reasons triggering unfinished care. Communication issues might have been increased during the pandemic due to PPE barriers and disruptions of the routines of the units (Matteis et al., 2021), requiring more integration among the staff. In addition, priority setting in turbulent environments might be more challenging and require additional competencies due to inadequate care models, often based on the division of tasks. In such circumstances, supervising nurses' aides might be an increased complexity due to the limited direct supervision possible in order to prevent unnecessary contacts, and the fragmentation of the care processes where nurses are at the bedside and nurses' aides supporting them.

## Limitations

First, the study was conducted during the second wave, thus under the pressure of the incremental number of COVID-19 cases: the incumbent stress might have affected the quality of answers and the time required to complete the survey. Second, given that the mission of the units has changed progressively according to the increased number of cases admitted to the hospitals, some participants might have been answering under the pressure of becoming COVID-19 units while they were not at the time of the survey. To prevent possible biases, researchers adopted several strategies (Table S3). Third, the number of participants was unbalanced (90 vs. 200) according to the progressive changes in the mission of the units, and this might have affected the perceptions of unfinished care by nurses as more involved in managing extraordinary conditions as compared with those working in non-COVID-19 units. However, in line with the debate in the field (Palese et al., 2021b), we involved only nurses working at the bedside.

Fourth, the UNCS part A was checked for violations of IIO in each group (COVID-19 and non-COVID-19) (Stochl et al., 2012), and no items were removed; in the original version, items with the highest significant number of violations of IIO were eliminated by retaining 21 of 38 (Bassi et al., 2020). Changes in the violations suggest that the tool validity is influenced by the context of care (Palese et al., 2021b) and therefore should be continually assessed for validity.

## CONCLUSIONS

Unfinished care during the second outbreak wave, as perceived by nurses working in medical and surgical units progressively converted to the care of COVID-19 patients, was measured. The overall occurrence of unfinished care is slightly higher than that perceived in pre-pandemic times, suggesting an increased perception of missed care in both COVID-19 and non-COVID-19 units, without differences between groups. Reasons triggering unfinished care were slightly higher among nurses working in COVID-19 units and were linked to the priority settings and human resources at higher significance among them as compared with those nurses working in

non-COVID-19 units. However, the most significant reasons triggering unfinished care were, in both groups, communication, priority settings and nurses' aides supervision issues.

## Implication for nursing and health policies

The profile of nurses caring for COVID-19 and non-COVID-19 patients was substantially homogeneous, suggesting that the second wave has been challenged by healthcare organizations by involving expert nurses in both groups of patients, without distinction. However, the significant higher proportion of part-time nurses involved in the care of COVID-19 patients suggests the need for strategies to ensure the continuity of care across the several nurses involved at the bedside; on the other hand, the low perception of staff adequacy among non-COVID-19 units might suggest a different support provided by the managerial infrastructure, which is currently more inclined to COVID-19 units. Ensuring support to both teams might increase equity and safety in the care delivered to patients. Moreover, according to the priorities emerged, nurses caring for COVID-19 patients are focused on the fundamental needs, while those working with non-COVID-19 patients give higher priority to the multiprofessional care plan: both nurses have ranked communication and emotional needs at low priority, suggesting that nurse managers should help them in prioritizing these elements of care by analyzing, in depth, barriers and facilitators.

Reasons for unfinished care were similar to those reported in previous studies before the pandemic, suggesting that under the tremendous stress experienced by the system and by nurses, such as in the second wave, the weaknesses already documented (namely, communication, priority settings, and nursing aides' supervision issues) remained relevant. Moreover, the substantial stability of the patterns of unfinished care reasons as compared with the pre-pandemic evidence available suggests a clear map of action for nurse managers that might be valid in the post-COVID-19 era as well as in the case of future pandemics.

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## CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

## ETHICS STATEMENT

The research protocol was approved by the Ethical Committee of the Verona Teaching Hospital (CESC Prot. n. 3875 del 21/01/2020, Prog. 2443CESC) and of the Azienda ULSS 9 Scaligera (September 23, 2020, and October 1, 2020, prot. N. 776).

## AUTHOR CONTRIBUTIONS

Made substantial contributions to conception and design, or acquisition of data: CMG, DFA, AE, AE, BL, SL, GL, PA;

made substantial contributions to analysis and interpretation of data: BL, SL, GL, PA; involved in drafting the manuscript or revising it critically for important intellectual content: CMG, DFA, AE, AE, BL, SL, GL, PA; 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: CMG, DFA, AE, AE, BL, SL, GL, PA; 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: CMG, DFA, AE, AE, BL, SL, GL, PA.

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## SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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