



Research Article

Hospital Outcomes in Non COVID Wards at a Northern Italy Hospital during COVID 19 Pandemic

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Abstract

Health emergency related to SARS-CoV-2 pandemic, with a dramatic lethality in the older population (especially for aged 80 and over), compelled the Italian Health Care System from February 2020 to re modulate hospital assistance and organization. To face the pandemic, several medical wards changed into “CoViD units”, while the remaining “non-COVID professionals” took care of patients with more severe and complex clinical problems, took care of patients with more severe and complex clinical problems due to delay in access to medical care, because of emergency context to the emergency context (delay in providing outpatient services or people concerns about COVID risk in hospitals). The primary aim of this retrospective observational study is describing pandemic-related consequences and adverse events (due to the emergency and lockdown) on hospitalized patients in a “non-COVID” medical hospital department in northern Italy, comparing the same period (March-June) of 2019 and 2020. Association between inadequate care and clinical risk is a fact, and adverse events and “missed care” outcomes in the pandemic context emerge from our study. Delayed or incomplete care, unmet patient needs, isolation from family and informal caregivers and the shift of healthcare professionals towards COVID-19 dedicated departments are the main “risk factors” in this peculiar scenario.

Keywords: Missed care; Lockdown; Clinical risk; COVID-19

Introduction

In February 2020, the outbreak of SARS-CoV-2 [1] spread rapidly mostly throughout northern Italy, leading to a complete lockdown. Morbidity and mortality impacted mostly on elderly population: fatality rates were less than 1% for people under 50 and up to 25% for people over 80. In addition, the risk of mortality in infected subjects was proportional to the number of comorbidities [2-4]. Difficulties in access to outpatient services and hospital

facilities, due to the pandemic surge on the Italian Health Care System, lead to more severe clinical conditions especially for elderly, comorbid patients [5].

Many hospital wards were converted into “CoViD isolation areas”, where doctors from every specialty were assigned to care of patients with SARS-CoV-2, therefore decreasing many outpatient and hospital ordinary activities [5, 6]. Because of this remodulation, chronic patients had to give up standard care procedures for prevention, treatment and follow up [7, 8].

Hospital wards dedicated to acute treatment of elderly people changed their clinical layout to deal with the wave of CoViD-19 patients at different levels of severity [9]. Internal medicine departments had to take care not only of CoViD-19 patients with intensive or sub-intensive needs but also of non-CoViD comorbid patients with high burden of clinical complexity [10].

Therefore, due to increase in burden of care and reduction of dedicated health-care professionals outcomes of quality of care worsened in terms of loss of functional capacity, delirium, depression, increased incidence of falls, pressure sores [11]; moreover, such a clinical situation often affected bio-psycho-social dimensions (re-hospitalizations, higher costs of care, and misleading referral to outpatient services) [12].

During the pandemic, as a safety measure, hospitals banned access to family members and to formal and informal caregivers, to establish a strict lockdown. Inadequate care and higher risk of adverse events is a well-know and evidence-based correlation: lower standards of care carry a higher risk of missed care, both in clinical and psychological dimensions [13-16].

Missed care is related to Health Associated Infections (HAI), delay in hospital discharge with an increased length of stay, early re-hospitalizations and others adverse events [12, 17, 18]; in addition, some authors defined “*solitary death*” the end-of-life scenario in hospitals during pandemic, due to isolation and social distancing [19, 20]. Our study focuses on the “*pandemic fallout*” (as a consequence of health emergency and lockdown) on a large number of patients in a non-Covid internal medicine ward of a hospital in northern Italy. We analyzed clinical and health-care differences, a few months before SARS-CoV-2 outbreak and during the first pandemic wave.

Patients and Methods

Data included in this analysis were obtained from a retrospective observational study conducted at Internal Medicine of Monfalcone Hospital (ASUGI), Friuli-Venezia Giulia, in Northern Italy.

Preliminary data evaluated the demographic characteristics of hospitalized patients, medical condition responsible of hospitalization, comorbidities, and overall clinical severity using the Cumulative illness Rating Scale (CIRS).

We analyzed hospital length of stay, discharge pathways and mortality data. Incidence of falls with traumatic or major consequences, onset or worsening of pressure sores, episodes of acute urinary retention, onset of delirium and Hospital Acquired Infections (HAIs) were encountered as “*missed care*”. In addition to clinical data, we evaluated the number of professional members assigned to the department and the average time spent per day for each patient.

Data were measured in the period from March the 1st to June 30th 2019, compared with the same period of 2020 (first CoViD-19 pandemic wave in Italy)

Statistical Analysis

All variables of interest were recorded with adequate indexes of synthesis (media and median) and of dispersion (standard deviation, min-max, interquartile distance) for continuous variables, while with absolute and relative frequencies for categorical ones. For each category of interest, statistical significancy was analyzed using t-test and chi-squared test, for continuous and categorical variables respectively, to compare differences between the pandemic lockdown period and the same period of the year before. All analyses were performed using SAS Version 9.4 (SAS Institute Inc., Cary, NC, USA) software, using SQL procedure for data extraction.

Results

Medical records of 1,206 hospitalized patients were analyzed: 696 between March 1st and June 30th 2019 and 510 in the same period of 2020. The main demographic and clinical characteristics are described in Table 1. The two populations of patients were homogeneous in gender, age, frequency of pathologies cause of hospitalization. There are also some Covid patients because there were detected after referral to the non-Covid ward.

Characteristics	2019 (%)	2020 (%)	p-value ^a
	N= 696	N= 510	
Sex			0.8744
male	328 (47.1)	238 (46.7)	
female	368 (52.9)	272 (53.3)	
Age			0.7937
mean (SD ^b)	80.4 (11.4)	80.2 (11.8)	
median (IQR ^c)	82.0 (74.5 – 89.0)	82.0 (76.0 – 88.0)	
Primary disease			
Bronchopneumonia	133 (19.1)	117 (22.9)	
Sepsis	124 (17.8)	88 (17.3)	
Heart failure	118 (17.0)	76 (14.9)	
Chronic obstructive pulmonary disease	111 (15.9)	91 (17.8)	
Cancer	102 (14.7)	66 (12.9)	
Digestive hemorrhage	49 (7.0)	32 (6.3)	
Cerebral ischemia or hemorrhage	35 (5.0)	24 (4.7)	
Other disease	24 (3.4)	16 (3.1)	
CoViD-19	0 (0.0)	10 (2.0)	0.0002
CIRS level			0.0004
0	0 (0)	0 (0)	
1	0 (0)	0 (0)	
2	277 (39.8)	147 (28.8)	
3	383 (55.0)	334 (65.5)	
4	36 (5.2)	29 (5.7)	

^aDifferences between the two groups were tested using chi-square or t test. ^b Standard deviation (SD). ^c Interquartile range (IQR).

Table 1: Main demographic and clinical characteristics of the patients.

As shown in Table 2, hospital length of stay was on average longer in 2020 than in 2019 with a significant increase in hospitalizations over two weeks. In addition, in 2020 there was a higher number of deaths and transfers to other specialist departments due to complications during hospitalization and greater difficulties in discharges at home.

	2019 (%)	2020 (%)	p-value ^a
	N= 696	N= 510	
Length of hospitalization (days)			<.0001
mean (SD ^b)	10.6 (5.9)	13.6 (8.2)	
median (IQR ^c)	9.0 (6.0 – 13.0)	12.0 (8.0 – 18.0)	
			<.0001
1-3 days	28 (4.0)	37 (7.3)	
4-7 days	221 (31.8)	81 (15.9)	
8-13 days	288 (41.4)	170 (33.3)	
14-20 days	110 (15.8)	137 (26.9)	
>21 days	49 (7.0)	85 (16.7)	
Mode of Discharge			
Nursing Home	33 (4.7)	32 (6.3)	0.2441
Home	282 (40.5)	167 (32.8)	0.0058
Home with nursing assistance	177 (25.4)	124 (24.3)	0.6578
Transfer to other ward	54 (7.8)	52 (10.2)	0.1397
Transfer in intensive care unit	12 (22.2)	19 (36.5)	0.03
Death	83 (11.9)	83 (16.3)	0.0303
^a Differences between the two groups were tested using chi-square or t test. ^b Standard deviation (SD). ^c Interquartile range (IQR).			

Table 2: Aspects related to hospitalization and discharge.

Five events of missed care (falls with damage, pressure sores, acute urinary retention, delirium and hospital-acquired infections) were recorded more frequently during the pandemic period with statistically significant differences compared to the previous year. A similar increased prevalence of HAIs (Table 3) was observed in 2020, although not statistically significant. In 2020, there was an increased prevalence of at least one HAI, but statistical significance was not observed for type or site of infection. Two or more missed care were simultaneously present more often in patients during 2020 hospitalization.

Missed care	2019 (%)	2020 (%)	p-value ^a
	N= 696	N= 510	
Falls with damage	117 (16.8)	145 (28.4)	<.0001
Pressure sores	25 (3.6)	47 (9.2)	<.0001
Acute urinary retention	115 (16.5)	156 (30.6)	<.0001
Delirium	283 (40.7)	289 (56.7)	<.0001
At least one Hospital-Acquired Infection	118 (17.0)	111 (21.8)	0.0354
Multiple missed care during hospitalization			<.0001

None	357 (51.3)	163 (32.0)	
One missed care	153 (22.0)	118 (23.1)	
Two missed care	87 (12.5)	98 (19.2)	
Three missed care	61 (8.8)	87 (17.1)	
Four or more missed care	38 (5.5)	44 (8.6)	
*Differences between the two groups were tested using chi-square.			

Table 3: Missed care during hospitalization.

In 2020, in addition to restrictions for family members and formal caregivers, there were significant changes in the professional team: physicians were 10 in 2019 and 7.5 in 2020 (one doctor shifted to a part-time contract); nurses decreased from 35 to 25 units and health care assistants from 28 to 25 (due to transfers to CoViD wards or because of CoViD-19 infection). (Table 4).

Therefore, the time devoted to each patient, per day, by the professional figures, was reduced by an average of 71 hours. We think that the reduced availability of nursing staff was the critical point of the observed missed care [8, 9]. In relation to the doctor’s daily work carried out on each patient, 53 minutes seems like a normal time, but two comments may be made. This time is not only devoted to medical activities but largely to the bureaucratic and administrative part, halving the actual time with the patient. Anyway, a significantly reduction of 24-25% of the doctor’s number was observed between 2019 and 2020, even if the employment contract of hospital doctors in Italy does not limit working hours.

Health workers	2019		2020		Differenze (%)	p-value ^{a,b}
	N	minute/day	N	minute/day		
						< .0001
Physicians	10	69.88	8	52.68	- 17.20 (- 25)	
Primary nurse	1	6.21	1	7.12	+ 0.91 (+15)	
Nurses	33	198.19	25	155.56	- 42.63 (- 22)	
Social-health workers	28	162.92	25	150.45	- 13.12 (- 8)	
Total	72	437.2	58	365.81	-71.39 (- 16)	

Table 4: Average time dedicated by each professional class for each patient for day.

Discussion

SARS-CoV-2 pandemic deeply changed medical and nursing care. Health Systems had to find innovative solutions for remodulation, creation of different care pathways and rearrangement of medical wards, according to levels of intensity of care [10]. The impressive number of papers on CoViD-19 support all these changes.

Nevertheless, SARS-CoV-2 pandemic also deeply and significantly affected departments and wards dedicated to “*non-CoViD*” patients, because of changes and remodulation of numbers of professionals and team duties. In addition, hospital lockdown forced “*non-CoViD*” patients to live in isolation: in such conditions, healthcare workers reported both professional and socio-psychological distress.

Our study aimed at describing events during lockdown in a non-CoViD internal medicine ward, to document the impact of pandemic on everyday care. As expected, data showed no differences between populations, neither in terms of demographic data nor pathologies that led to hospitalization, in 2019 and 2020.

Analysis of the Cumulative Illness Rating Scale showed a trend to a higher prevalence of medium-severe patients (CIRS 3) in 2020, compared to 2019, especially in the last months of the first pandemic wave. Late access to the Emergency Departments and concerns about isolation due to hospital lockdown could be an explanation [21-28] to physicians’ perception, during lockdown, of a greater clinical complexity in hospitalized patients.

Other factors may have been the pandemic-linked decrease of ordinary outpatient and follow-up activities, together with a difficult access to General Practitioners and therefore supply of life-saving drugs, compromising a proper compliance of patients [8, 9].

A longer hospital length of stay could be potentially related to an overall increased clinical complexity [28, 29] together with a difficulty in discharge at home or in outpatient facilities [30, 31], because of mandatory quarantine before dismissal. Access to outpatient facilities and hospices was preferentially granted to home-care patients, therefore leading to prolonged waiting lists for hospitalized patients. Informal caregiving was severely conditioned during CoViD-19 pandemic by mandatory quarantine rules, leading to delay in possibility of returning to Italy from nations of origin, especially if Eastern European countries since a large amount of labor people dedicate to caregiving fragile people come from this part of Europe. Furthermore, economic crisis and reduction of social and healthcare home assistance potentially contributed to delayed hospital discharge.

During lockdown, adverse events, expression of “missed care”, were significantly higher than in 2019: patients developed higher degrees of delirium, falls with injury, pressure sores, urinary retention, and hospital-acquired infections.

Our data demonstrate an important and extremely significant increase in delirium episodes during lockdown. Diagnosis, treatment and follow-up of delirium and its underlying causes is of utmost importance especially in hospital settings where the prevalence may reach 80% [32-37]. Delirium is highly associated to mortality, rapid decline in performance status and autonomy, prolonged hospital length of stay (as previously shown), device removal and self-removal, patient and caregiver distress. Physiopathology of delirium is multi-factorial, and it is mandatory to consider both risk and precipitating factors [38-39], that are potentially reversible and preventable. This leads to the evaluation and valorization of the other events of missed care our study pointed out, as possible trigger events for delirium.

During lockdown, falls often resulted in severe injury, with need for further radiological and specialistic assessment. Some patients had to undergo surgical procedures and had to be centralized to a “hub-center”. Pelvis fractures and conservative-treated hip fractures lead to immobilization with reduction in autonomy, increase in pressure sores and acute urinary retentions, delirium, dehydration, sleep-wake cycle disturbances, HAIs, potentially contributing, in some cases, to death of the patient.

Pressure sores and urinary retention highly increased during lockdown. Urinary catheter placement, especially if the patient was not cognitively intact, frequently resulted in self-removal of the device, with abundant bleeding, need for specialist consultancy

and transfusion requirements. These acute clinical complications, potentially contributing to delirium, increased clinical and care burden, further worsened frailty and prolonged length of hospital stay and may have increased the risk of death of patients.

Hospital-acquired infections (HAIs) showed a trend in increase during 2020 lockdown, especially in prolonged hospitalizations. As reported in other studies, also in our experience, respiratory and urinary tract are the most affected [37]. As for HAIs, also the incidence of other adverse events became more relevant as hospitalization became longer.

SARS-CoV-2 pandemic heavily affected our ward organization, with a significant reduction in physicians, nurses and health care assistants that were allocated in other words, as all around Europe [40, 41], therefore reducing assistance to *non-CoViD* patients. Translated in daily “*time of assistance*”, during the pandemic months of 2020, each patient received 70 minutes less of global assistance respect the same period of 2019, with fewer possibility of mobilization, satisfaction of basic needs as hydration and evacuation. Fewer healthcare personnel may have led to reduced supervision with increase in number of falls especially in frail subjects, affected by dementia and experiencing delirium. In a “*non-COVID*” ward, re modulation of healthcare assistance, clearly and deeply affected modality and timing of patient assistance.

Loosing caregiver’s help and support, associated to healthcare reduction, has potentially contributed to increase in missed care, especially in patients who were isolated because of clinical requirements. Caregiving is essential also in acute settings to help with food intake, maintaining mobilization and autonomy, stimulating and preserving cognitive capacities, especially if patients are old and frail. Nocturnal assistance by family members is crucial in reducing delirium and sleep-wake disturbances [42].

CoViD-19, though “physically absent” in our ward, deeply influenced our working organization and modality of care, leading to an important and alarming worsening of clinical outcomes.

Limitations

This study has some limitations. The design is retrospective and data collection and analysis is based on medical records. Caregiving cannot be reported and translated in numbers. Some facts and events in the text are based on reports of healthcare personnel.

Conclusions

Association between inadequate assistance, risk and clinical damage is extensively reported in literature [43-46]. Reduced healthcare assistance leads to insufficient levels and quality of care. Delayed or incomplete satisfaction of patient’s needs

favors missed cares and clinical events that have been described. Reduction and shifting in healthcare personnel and caregiving lockdown (the absence and failure of “human factor” in caring) are fundamental elements to understand this worrisome phenomenon.

Starting from what we learned during the dramatic first wave, and assuming this is an observational study we suggest some complex interventions to reduce the risk of missed care:

Select/identify fragile patients at greater risk of complications related to missed cares.

Dedicate a single room to the most fragile with the possibility of staying as a caregiver for the duration of hospitalization.

Organize “*after covid and swab*” screening to caregiver.

Ethical approval procedure:

This study has been approved by the Ethical Committee of the A.S.L. of Udine on March 2021.

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