

# Impact of the Covid-19 pandemic on palliative care provision by a hospital-based unit: results from an observational study

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## ABSTRACT

### Background

Palliative care is a key approach in improving the quality of life of patients and their families facing the end-of-life care process. It is widely regarded as a public-health concern, especially considering the rapidly increasing end-of-life care needs worldwide. Its provision has been highly challenged by the COVID-19 pandemic emergency.

### Objective

This study aims to analyse whether and to what extent the provision of Palliative Care to non-COVID patients provided by a hospital-based unit has changed during the COVID-19 pandemic.

### Material and methods

A retrospective observational study was performed. All non-COVID patients admitted from October 1, 2019 to September 30, 2020 and evaluated by the hospital-based Palliative Care team were considered. Three time periods were considered: pre-lockdown, lockdown and post-lockdown. A trend analysis and multiple linear and logistic regressions to study and quantify the statistical significance of the associations were performed.

### Results

A statistically significant positive linear trend of the number of hospitalized patients in need of Palliative Care was found over the study period. Compared to pre-lockdown, the rest of the study period presented more female and elderly patients, the length of stay and the number of patients discharged to a Hospice setting were significantly reduced. The waiting time did not change in lockdown but decreased in post-lockdown and the mortality rate was not significantly different. Also, the average number of Palliative Care consultations per patient significantly increased in the lockdown and post-lockdown.

## Discussion

First, the significant admissions drop between the start of the pandemic and the following study period is in line with recent literature. The consequent rebound registered may be attributed to the high pressure from outside requiring admission and care. Second, the significantly older age of patients found during the lockdown than before the lockdown could be attributed to a “selection effect” of young patients, more able to delay hospitalization than the elderly, also in line with recent literature.

Third, the shorter waiting time for Palliative Care activation the post-lockdown compared to the pre-lockdown period could be due to both increased hospital efficiency and to the greater pressure to discharge patients during the post-lockdown period. Also, the significant reduction in the lockdown and post-lockdown of the length of stay after Palliative Care activation could be explained considering both the greater receptivity of healthcare services outside the hospital, such as Hospices, and the greater pressure on hospital wards to discharge. Fourth, the unchanged in-hospital mortality rate remained over the entire period could be an indication of the high quality of care provided by this hospital setting to fragile patients, which is to be noted especially considering the average mortality rate registered during pandemic context in healthcare facilities.

## Conclusions

The study aimed to quantify the impact of the COVID-19 on the provision of Palliative Care by a hospital-based team. We believe it might represent an innovative contribution and we hope similar research will be produced in order build the evidence for future challenges in this field.

## RIASSUNTO

### Background

Le Cure Palliative rappresentano un approccio fondamentale. per migliorare la qualità della vita dei pazienti terminali e delle loro famiglie. Esse rientrano ampiamente tra i temi di sanità pubblica, soprattutto considerando il rapido aumento dei bisogni di salute connessi al fine vita in tutto il mondo. La loro erogazione è stata fortemente messa in discussione dall'emergenza pandemica da COVID-19.

Questo studio mira ad analizzare se e in che misura l'erogazione di Cure Palliative a pazienti non COVID da parte di una Unità ospedaliera è stata modificata dalla pandemia da COVID-19.

### Materiali e metodi

È stato eseguito uno studio osservazionale retrospettivo. Sono stati presi in considerazione tutti i pazienti non COVID ricoverati dal 1° ottobre 2019 al 30 settembre 2020 e valutati dall'Unità di Cure Palliative ospedaliere. Sono stati considerati tre periodi di tempo: pre-lockdown, lockdown e post-lockdown. Sono state eseguite un'analisi di trend e regressioni lineari e logistiche multinomiali per verificare e quantificare la significatività statistica delle associazioni.

## Risultati

In primo luogo, il calo significativo dei ricoveri tra l'inizio della pandemia e il successivo periodo di studio è in linea con la recente letteratura. Il successivo rialzo registrato può essere attribuito imputabile all'elevata pressione esterna per il recupero delle cure. In secondo luogo, l'età significativamente più avanzata dei pazienti riscontrata durante il lockdown rispetto al pre-lockdown potrebbe essere attribuita a un "effetto selezione" dei pazienti giovani, maggiormente in grado di rimandare un ricovero rispetto agli anziani, in linea anche questo con la letteratura. In terzo luogo, il tempo di attesa più breve per l'attivazione delle Cure Palliative nel periodo post-lockdown rispetto al pre-lockdown potrebbe essere dovuto sia alla maggiore efficienza ospedaliera sia alla maggiore pressione per dimettere i pazienti durante il periodo post-lockdown. Anche la significativa riduzione del lockdown e post-lockdown della durata della degenza dopo l'attivazione delle Cure Palliative potrebbe essere spiegata considerando la maggiore ricettività del servizio sanitario extraospedaliero, come gli Hospice, e la maggiore pressione alle dimissioni sui reparti ospedalieri. In quarto luogo, il tasso di mortalità intraospedaliero rimasto invariato per l'intero periodo potrebbe essere un'indicazione dell'elevata qualità dell'assistenza fornita da tale ospedale ai pazienti fragili, dato degno di nota soprattutto considerando il tasso di mortalità medio registrato nelle strutture sanitarie durante la pandemia.

## Conclusioni

Lo studio ha cercato di quantificare l'impatto del COVID-19 sull'erogazione di Cure Palliative da parte di un'Unità ospedaliera dedicata. Crediamo che possa rappresentare un contributo innovativo e speriamo che ricerche simili vengano intraprese per generare future evidenze in questo ambito.

## INTRODUCTION

Palliative Care is an approach that improves the quality of life of patients and their families facing the problems associated end-of-life care through the prevention and relief of suffering by means of early identification, assessment and treatment of pain and possible physical, psychosocial and spiritual problems (1).

It is widely regarded as a public health concern (2), especially considering the rapidly increasing end-of-life care needs worldwide (3). Both structural and social determinants of health affect health inequalities for disadvantaged populations across high-income and low-income countries. Palliative-care providers are highly encouraged to adopt new public health approaches, or actions framed around health-promoting palliative care, in order to be best-equipped to tackle the challenges of equity and access for diverse populations (2).

During a global health emergency, such as the COVID-19 pandemic, the first efforts are aimed at saving as many human lives as possible, so the allocation of resources and reorganization of health systems mainly concerns areas of medicine with intensive characterization (emergency room, intensive care and sub-intensive care wards, infectious disease wards) (4).

A recent paper by KJ Wynne et al. states how "humanitarian crises and emergencies, events that are often marked by high mortality, have until recently excluded palliative care

—a specialty focusing precisely on supporting people with serious or terminal illness or those nearing the end of life”, defining it a “paradox” (5). Palmer et al. (6) described multiple factors challenging appropriate Palliative care provision during a pandemic. The main ones consist in the complexity of defining palliative care needs (also considering the impact of pre-existing conditions and the ones acquired during the crisis), timely access needed to often limited resources and how it impacts on priority setting, the lack of specific guidelines and training on specific as well as possible ethical reasons and potential objections to the provision of palliative care (6).

The WHO 2018 guidelines (2) defined principles that should apply to palliative care from a population health perspective in any humanitarian crisis such as relieving human suffering, never intentionally hastening death, not regarding palliative care and life-saving treatment as distinct, commencing palliative care immediately, as needed, for patients with non-life-threatening conditions whose injury or disease-specific treatment may be delayed and, for all patients deemed expectant.

With regards to emergency and humanitarian crises, the COVID-19 pandemic showed how preparedness is important. The WHO proposed the “Strategic Framework for Emergency Preparedness” (7) which identifies the principles and elements of effective health emergency preparedness. It adopts the major lessons of previous initiatives and lays out the planning and implementation process by which countries can determine their priorities and develop or strengthen their operational capacities. The WHO advocates the importance of strengthening preparedness and systemic response at the national level (8). In this regard, at the Italian national level, the 2010 (9) law provided a common definition as well as the criteria and conditions by which to grant access to Palliative Care. This law and the following legislation established a framework and created a Palliative Care Network (10). At the Italian regional level there are various examples, the framework pertaining to the specific object of the study is the Lazio Region, which also established a common framework (11) and put a Palliative Care Network in place (12).

The COVID-19 pandemic has had a major impact on the provision of Palliative care for both COVID and non-COVID patients. Many studies have already been carried out to capture the extent of the repercussions of the pandemic, during the emergency phase, on healthcare provision destined to non-COVID patients and to acknowledge the lessons learned (5,6,13-17).

This paper aims to analyse the variation in characteristics of a population of patients under the care of an Italian hospital-based Palliative Care team during the first Italian pandemic wave (from February to May 2020 (18)) in relation to a defined previous and following period. The purpose is to study whether and to what extent its provision of hospital-based Palliative Care to non-COVID patients changed during the pandemic.

## METHODS

An observational cross-sectional study was performed. All non-COVID patients admitted from 1 October 2019 to 30 September 2020 who were evaluated by the team of Palliative Care of the “Fondazione Policlinico A. Gemelli IRCCS” in Rome (from now on called “FPG”) were considered.

The study period was divided into three four-month periods as defined:

- Pre-lockdown period (period 1): patients entered the hospital from October 1st, 2019, to January 31st, 2020. This is a period of normal activity.

- Lockdown period (period 2): patients admitted to the hospital from February 1st, 2020, to May 31st, 2020. This period includes the first pandemic wave and the first national lockdown.
- Post-lockdown period (period 3): patients entered the hospital from June 1st, 2020, to September 30th, 2020. This period includes the end of the national lockdown and the beginning of the second pandemic wave.

The following variables were recorded for each of these periods:

- number of patients;
- age;
- gender;
- diagnosis (oncological versus non oncological);
- length of hospitalization;
- mortality rate;
- latency time for activation of Palliative Care, i.e. the time taking for the request for Palliative Care consultation;
- length of stay after the Palliative Care consultation, i.e. the time elapsed from the request for Palliative Care consultation to the time of the patient's discharge or death;
- average number of Palliative Care consultations per patient;
- discharge setting (Palliative Home Care versus Hospice setting).

A trend analysis using linear regression was carried out to determine the degree and statistical significance of any growth or decrease in the number of hospitalizations per month throughout the period of study.

A descriptive statistic of the variables, summarized in Table 1, with the appropriate measures of central tendency and dispersion was performed. Categorical variables were described as relative frequency (percentage of the total).

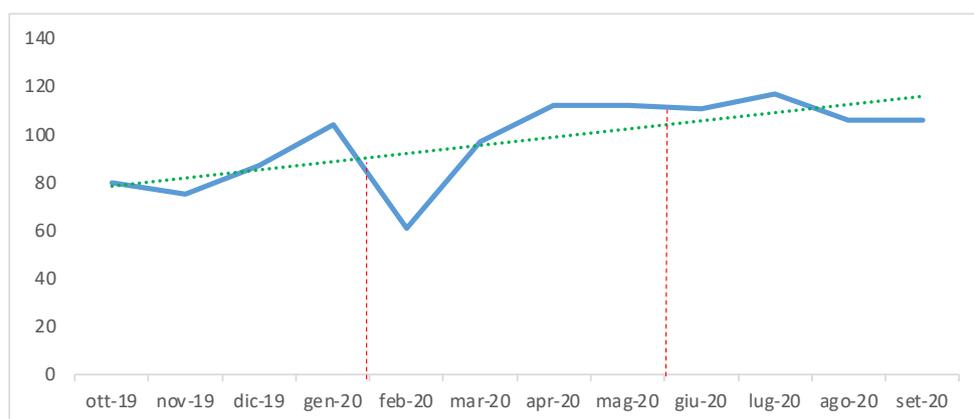
Therefore, quantitative variables were tested for normality assumption with a Shapiro-Wilk test.

Finally, an inferential statistic was carried out using linear regression for the quantitative dependent variables and a logistic regression for the categorical dependent variables to determine the degree and statistical significance of the observed differences between the variables of periods 2 and 3 versus period 1, considered "baseline" as being the situation of ordinary activities. For linear regression, the output was indicated as RC ("Regression Coefficient"). For logistic regression, the OR (Odds Ratio) was reported. The level of statistical significance was set at  $p = 0.05$ .

All research was conducted in accordance with the Institutional Review Board and received full final approval (protocol number PROT ID 4111).

## RESULTS

Firstly, the trend in the number of hospitalized patients for which a Palliative Care evaluation was requested was analysed. The analysis found a statistically significant positive linear trend (RC 3.41;  $p = 0.011$ ), as shown in Figure 1.



**Figure 1.** Trend in the number of hospitalized patients for which an evaluation of Palliative Care was requested in the study period (October 2019 – September 2020), highlighting the three time periods (dashed red lines) and the positive linear growth trend (dotted green line).

However, as also visible from Figure 1, a significant drop in the number of admissions was found between the first month at the start of the pandemic (February) and the rest of the study period admission rate average (60 vs 99,  $p = 0.000$ ). All quantitative variables resulted to be not normally distributed, therefore they were described by using median and IQR (interquartile range). The total number of patients studied was 1168. The total number of Palliative Care consultations performed was 1482.

Of the 1168 patients, 264 deceased during hospitalization. For 883 patients the destination of discharge was known: 454 to Palliative Home Care (53.22%) and 399 to Hospice setting (46.78%). In particular, as shown in Table 1, during period 1 (pre-lockdown), 147 patients were discharged to a Hospice setting (44.53%), 110 patients to Palliative Home Care (55.47%). During period 2 (lockdown), 122 patients were discharged to a Hospice setting (56.74%) and 160 in Palliative Home Care (43.26%). During period 3 (post-lockdown) 130 patients were discharged to a Hospice setting (58.60%) and 184 to Palliative Home Care (41.40%). The remainder of the study variables, already detailed in the Methods section, were also stratified across the three periods, as shown in Table 1.

**Table 1.** Descriptive statistics of the studied variables stratified by the three defined periods - Created by the authors

Variables	Period 1	Period 2	Period 3
No. of inpatients	364 (31.16%)	382 (32.71%)	440 (37.67%)
Age	Median = 76; IQR = 20	Median = 78; IQR = 17	Median = 77; IQR = 22
Gender	M = 46.82%; F = 53.18%	M = 48.43%; F = 51.57%	M = 39.09%; F = 60.91%
Oncologic vs non-oncologic cases	46.82% vs 53.18%	42.93% vs 57.07%	48.25% vs 51.75%

Length of stay (in days)	Median = 18; IQR = 16	Median = 15; IQR = 12	Median = 14; IQR = 13
No. of deceased patients	84 (24.28%)	93 (24.35%)	107 (24.32%)
Waiting time before Palliative Care activation (in days)	Median = 7; IQR = 11	Median = 7; IQR = 9	Median = 4; IQR = 8
Length of stay after Palliative Care evaluation (in days)	Median = 8; IQR = 10	Median = 6; IQR = 7	Median = 8; IQR = 7
Palliative Care evaluations	Median = 1; IQR = 0	Median = 1; IQR = 0	Median = 1; IQR = 1
Hospice vs home discharge	55.47% vs 44.53%	43.26% vs 56.74%	41.40% vs 58.60%

The results of the inferential statistical analysis are shown in Table 2.

**Table 2.** Inferential statistics on the studied variables stratified by the three defined periods (significant findings in bold)

Variables	Period 2: (vs Period 1)	Period 3: (vs Period 1)
No. of inpatients	RC = 9; p = 0.446	RC = 23.5; p = 0.067
Age	RC = <b>2.65</b> ; p = <b>0.020</b>	RC = 0.82; p = 0.220
Gender (Male/Female)	OR = 1.06; p = 0.664	<b>OR = 0.73</b> ; p = <b>0.003</b>
Oncologic vs non-oncologic cases	OR = 0.85; p = 0.292	OR = 1.86; p = 0.738
Length of stay (in days)	RC = <b>-2.73</b> ; p = <b>0.050</b>	RC = <b>-5.83</b> ; p = <b>0.000</b>
No. of deceased patients	RC = 1.67; p = 0.696	RC = 1.57; p = 0.116

Waiting time before Palliative Care activation (in days)	RC = -0.41; p = 0.661	RC = -3.91; p = 0.000
Length of stay after Palliative Care evaluation (in days)	RC = -2.87; p = 0.000	RC = -1.94; p = 0.007
Palliative Care evaluations	RC = 0.19; p = 0.002	RC = 0.18; p = 0.000
Hospice vs home discharge	OR = 0.57; p = 0.001	OR = 0.53; p = 0.001

As show in table 1, in period 2 compared to period 1, the population was significantly more elderly with more female than male patients. The length of stay was significantly reduced in both periods 2 (p=0.050) and 3 (p=0.000). The waiting time did not change significantly in period 2 compared to the “baseline”, but it decreased significantly in period 3 (p=0.000). The length of hospitalization after the activation of Palliative Care significantly decreased both in period 2 (p=0.000) and in period 3 (p=0.070) compared to the “baseline” Period 1. In addition, the mortality rate did not significantly change over the study period: during hospitalization, 84 patients died in period 1 (24.28%), in period 93 died in period 2 (24.35%) and 107 patients (24.32%) in period 3 (p=0.696; p=0.116). Also, the average number of Palliative Care consultations per patient significantly increased in periods 2 (p=0.002) and 3 (p=0.000). Furthermore, in period 2 and period 3 compared to period 1, the number of patients discharged to a Hospice setting significantly decreased compared to patients discharged to Palliative Home Care (p=0.001 for both study periods).

## DISCUSSION

First, the trend analysis highlighted how the activity of Palliative Care Unit has increased progressively and steadily over the study period (October 2019 – September 2020). The finding that a significant drop in the number of admissions was found between the first month at the start of the pandemic (February) and the rest of the study period is both understandable and in line with recent literature (13,17-20).

After that, already from March onwards a rebound in the number of admissions was registered, due to the high pressure from outside requiring admission and care.

Second, the study found that, during the lockdown, the hospitalized population that was assessed by the Palliative Care team was significantly older than in period 1 (before the lockdown). This could be attributed to a “selection effect” of young patients who could have delayed hospitalization to avoid the risk of hospital contagion. Marco Brayda-Bruno et al. found a similar result regarding fractured patients admitted to the hospital during the first pandemic wave. They described the change of the traumatology and hospital setting during the lockdown. The analysis has shown a significantly lower average age for patients in 2019. The authors concluded that COVID-19 pandemic has modified the epidemiology of hospitalized patients for traumatic reasons, leading to an increased admission of older patients with femoral fractures (21).

Third, the length of stay was significantly reduced both during the lockdown and the post-lockdown period, compared to the pre-lockdown period.

In particular, regarding the waiting time for Palliative Care activation, it significantly decreased in the post-lockdown compared to the pre-lockdown period. This could be attributed to both the increased efficiency of the hospital wards medical staff or to the greater pressure to discharge patients during the post-lockdown period. Farroha et al. explored the effect of pandemic disease on the length of stay in hospital. This retrospective study compared the hospital length of stay of patients admitted to a regional burn centre during six weeks of lockdown (23rd March - 6th May 2000) to the length of stay last year (23rd March - 6th May 2019). The authors found a 68% decrease in length of stay during the lockdown period (22).

Regarding the length of stay after the activation of Palliative Care, it significantly decreased both in the lockdown and the post-lockdown period. This could be explained in light of both the greater receptivity of healthcare service outside of the hospital, such as Hospices, and the aforementioned greater pressure to discharge on the part of hospital wards due to the increase in hospitalizations observed in these two periods.

Fourth, in-hospital mortality rate remained unchanged over the entire period. This could be an indication of high quality of care provided by this hospital setting to fragile patients, which is to be noted especially considering the average mortality rate registered during pandemic context in healthcare facilities (13).

Fifth, the average number of Palliative Care consultations per patient slightly increased during lockdown and post-lockdown, compared to the pre-lockdown period. This could be due to the supposedly higher level of clinical complexity of hospitalized patients during these two periods. In particular, the greater clinical complexity may be attributed to both the aforementioned "selection effect" regarding the access to hospitals and the subsequent worsening of the clinical conditions given the postponement of care delivery (14,21).

Finally, compared to pre-lockdown, the proportion of patients discharged to home-based Palliative Care significantly increased during lockdown and post-lockdown compared to the proportion discharged to a Hospice setting. This could be due to several factors. During the lockdown and post-lockdown period, some Hospices blocked admissions due to confirmed cases of SARS-CoV-2 within the healthcare facility, meaning that discharge was granted mainly through home-based Palliative Care. Furthermore, visits by relatives to patients in Hospices were blocked during the lockdown and highly limited during the post-lockdown (23). This may have been a contributing factor for patients' families to prefer home-based Palliative Care to a Hospice setting, as well as their justified fear of infection risk related to healthcare facilities.

The study has some limitations.

First, data regarding destination of discharge was missing for 285 out of 1168 total patients. We however believe this had not in impact on the analysis.

Second, clinical complexity was considered in the discussion as a possible contributing factor to the observed phenomena, however it was not assessed via any specific evidence-based score by the team.

Finally, the study is based on a single-center experience. We nonetheless believe that, given the size and interconnectedness of the hospital in which the Unit operates, it can be regarded as a representative experience for many other researchers and professionals working in the field.

The study has also some strengths.

First, the study addresses the impact of the COVID-19 pandemic on Palliative Care, which is widely regarded in literature as an important and emerging public health theme.

Second, we believe the study proposes an innovative way of analysing a specific hospital-based Palliative Care setting enabling to capture the complexity and interconnectedness of the activity of the hospital Unit in the context of a large hospital.

Lastly, we believe the chosen study period, a year-long observation right at the heart of the emergency (before, during and after the national lockdown periods), is of great significance.

## CONCLUSIONS

Palliative Care improves the quality of life of patients and their families facing the problems associated with end-of-life care (1).

It is widely regarded as a public health concern (2), especially considering the rapidly increasing end-of-life care needs worldwide (3). It is important to show how the need for health emergency preparedness and systemic response, as expressed by the WHO, is carried out from the international level to national, regional level and down to single hospital Unit such as the one object of the present study. The study aimed to quantify the impact of the COVID-19 on Palliative Care provision by a hospital-based Palliative Care team. Other recent studies have already been carried out to understand and quantify the extent of the repercussions of the COVID-19 pandemic on the provision of care for non-COVID patients and to acknowledge the lessons learned (5,6,13-17). However, for the reasons reported in the strengths section of the paper, we believe the study has an appeal to an international audience and that it might provide a significant contribution to build evidence to face future challenges in this field.

## COMPETING INTERESTS

The authors declare no competing interests

## FUNDING

No funding was needed

## DATA AVAILABILITY

Data will be made available via specific request to the Corresponding author

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