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RESEARCH ARTICLE

Comprehensive Analysis of Mortality in a Hospital Center in the Year 2020 and the Provision of Palliative Care in Current Medical Practice

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SUMMARY

In this retrospective investigation carried out in a mutual hospital in Montevideo between 2019 and 2020, a quantitative and descriptive analysis of patients older than eighteen years of age who died during that period was carried out. The main objective was to examine the medical records of these patients during the six months prior to their death, using the NecPal 3.1 instrument to assess their clinical variables. The confidentiality and anonymization of the patient data were carefully protected, and a specific database was created for this study. The results obtained provided a detailed description of the patient population, their palliative needs and the quality of care at the end of their lives. The proposed working hypothesis maintained that palliative care did not reduce unnecessary hospital admissions, with a significance level (p) less than 0.05. During the period studied, 200 deaths were registered, with a predominance of women and a mean age of 73.6 years. Of these deceased, 136 had palliative needs, and of these, 50 were admitted to a palliative care unit. The results revealed that patients who did not receive palliative care experienced a greater number of hospital admissions compared to those who did. This led to rejecting the null hypothesis and demonstrating that palliative care had a significant preventive effect in terms of hospital admissions at the end of life.

Keywords: Palliative care, Chronic diseases, Intensive care unit, Hospital admission, End-of-life care.

Introduction

The place of death should be considered as part of the quality of life.¹Families and patients prefer treatment aimed at controlling their symptoms rather than prolonging their lives.²Dying at home is preferred in patients with advanced disease and their primary caregivers.³Studies in the United States reveal that between 23% and 66% of people over the age of 65 die in acute hospitals despite their personal preferences.⁴In Europe, most deaths occur in hospitals or in institutions with a clinical context.⁵

Data suggests that 51% of older adults visit the emergency department during their last month of life.⁶Some reports indicate that more than 75% of older adults visit the emergency service during the last six months of life.⁷77% of patients who have visited the emergency department during the last month of life were hospitalized and 68% died while hospitalized.⁸

The demographic transition is one of the reasons for the increase in visits to emergency services for all conditions, with visit rates for patients 50-64 years old increased by 13% and those 65-74 years old increased 11% since 1995 to 2005. It is estimated that by the year 2030 people over the age of 65 will represent 20% of the population.⁹Chronic non-communicable diseases (NCDs) are the leading cause of death in the world. For them, 41 million people die each year, accounting for 71% of the deaths that occur in the world. In the Americas region, there are 5.5 million each year.¹⁰Consultations of elderly patients and patients with complex diseases who need palliative care to alleviate exacerbations of their chronic diseases have increased.¹¹

A study carried out by Tripodoro et al, in 2012, found that 73.4% of patients admitted to the Public Hospital of the Autonomous City of Buenos Aires had advanced chronic diseases and palliative needs.¹²

The change that Western societies have undergone in recent decades means that an increasing number of end-of-life patients are transferred to hospital emergency services.¹³Determining which patients should not die while hospitalized is complex, since in addition to clinical factors, sociocultural change must be taken into account.¹⁴In general, emergency services and intensive care units (ICU) do not have the necessary tools to offer a dignified death to these patients with complex advanced chronic diseases and advanced cancer.¹⁵

In Uruguay, there is evidence of a process of population aging that has been going on for several decades. This process has accelerated, so that the elderly population has increased and people over 60 years of age today constitute 19.1% of the total population.¹⁶From 2011 to 2022, palliative care care has gradually increased in Uruguay, reaching 69% of all people eligible for palliative care. End-of-life care requires health and technical services that ethically apply their knowledge and make decisions following the patient's preferences in all aspects related to the final stages of life. ¹⁷A decrease in ER visits has been associated with hospice care at home in the last six months of life.^{18 19}

According to a systematic review²⁰, patients who receive care from a palliative care unit or have advance care planning consistently show a trend towards a reduction in both admissions and days of stay in intensive care units. A high rate of visits to the emergency department during the last weeks of life are indicators of poor quality care at the end of life.²¹The role of palliative care (PC) has acquired preponderance in the care of patients with complex chronic diseases, advanced chronic diseases, multiple pathologies, and advanced frailty.

The primary objectives of the work have been to describe the population that enters the sanatorium to die and its characteristics, to determine the palliative needs in the last six months of life and to assess the level of statistical significance of the hypothesis.

Secondary objectives were defined to investigate the number of hospitalizations in the six months before death with and without NecPal clinical criteria, to distinguish the different scenarios of hospital death, to know the periods of time hospitalized before death, to compare the days of hospitalization in patients with palliative needs not covered with those who did have them and if this has an economic impact on hospitalization costs.

Methodology

A retrospective cohort study was carried out, with all patients over eighteen years of age, who died in a sanatorium of a Montevideo mutualist, with sixty-five thousand users between January 2019 and January 2020. Minors were defined as exclusion criteria. eighteen years of age and people who died in the emergency service upon admission.

With the authorization of the technical management, work has been done on the electronic medical record (EHR) of each deceased person. The medical file department generated a list with the identity cards of the users, ensuring the confidentiality of the data with a personal and unique password, used by the researchers to access them. The data has been anonymized, no data on personal or family information of the deceased was acquired. The medical records of the last six months of life were studied, inquiring whether the people were being cared for by the palliative care unit. If they were not treated, it was analyzed if they presented any criteria of clinical palliative need not covered according to the Palliative Needs instrument, version 3.1 (NecPal 3.1©), built by the Institute of Oncology of Catalonia (ICO) and validated for use in South America.²² A single clinical item was needed to define that the person had palliative needs. The surprise question and care request variables cannot be evaluated because it is a retrospective study of medical records.

Specific clinical and demographic data of the patients were collected by preparing, using office software, a form for processing.

An ad hoc database of all the deceased was designed. Quantitative variables were worked on,

age in years at death, number of hospital admissions in the six months prior to death, hospitalization time in the different sectors before death. Other variables used have been gender, place of death after hospital admission, having a positive clinical item of the palliative needs instrument that defines advanced disease and absence of palliative care care.

Patients have been classified into oncological and non-oncological, the former being those who presented advanced stage 4 disease and the latter the rest of the organ diseases that meet the criteria established in the NecPal instrument.

The initial null hypothesis is that the patients admitted to the palliative care unit were not safe from hospitalizations in the different sanatorium areas. Using the relative risk, odds ratio and Pearson's Chi square statistics, the correlations were evaluated, proposing statistical significance with $p < 0.05$.

The data processing was done with the RStudio software based on the R language.²³

Results

In the period studied, 200 deaths were registered in the sanatorium.

Total	Men	Women	Average of age (years)	Average of		
				DS	Median (years)	Mode (years)
200	85	115	73.6	15.04	76	88
100%	42.5%	57.5%				

Table 1: Demographic characteristics of the study population

Of the total number of patients who were admitted to the sanatorium to die, 50 (25%) had home care for palliative care. The death scenarios after admission are detailed in the following table.

SS	F. Absolute	F. Relative
ICU	71	35.5%
HALL	129	64.5%
	200	

Table 2: Place of death on hospital admission.

The portion of patients who presented palliative needs six months before their death totaled 136 people, of which only 50 (36.7%) were in care with a palliative care unit.

Of the total deaths in the period, 70 were oncological and 130 were non-oncological. Of all the cancer patients who died, only 44 (62.8%)

were in palliative care, while only 6 (4.6%) of the patients classified as non-cancer were cared for by the palliative care team.

The following table details the number of hospital admissions six months before death, distributed between patients seen by the palliative care unit and those seen by their referring physician.

Number of Admissions to mutual hospital.	TOTALS	Absolute frequency of patients in palliative care	Relative frequency of patients in palliative care	Absolute frequency of patients without palliative care	Relative frequency of patients without palliative care	Relationship between patients without palliative care and with palliative care
1	111	twenty	18.0	91	81.9	4.55
2	58	twenty	34.4	38	65.5	1.90
3	23	6	26.0	17	73.9	2.83
4	8	4	50.0	4	50.0	1.00
						Average
	200	fifty		150		2.57

Table 3: Number of hospital admissions six months before death.

The patients who were admitted to the sanatorium without palliative care and with Necpal criteria are described below.

Number of hospital admissions 6 months prior to death				
	total patients	Absolute frequency of patients without palliative care	Absolute frequency of patients with NECPAL+ clinical criteria	Relative frequency of patients with NECPAL + clinical criteria
1	111	91	47	51.5%
2	58	38	26	68.4%
3	23	17	9	52.9%
4	8	4	4	100%
	200	150	86	68.2%

Table 4: Absolute and relative frequencies of patients without palliative care with NecPal criteria by number of admissions.

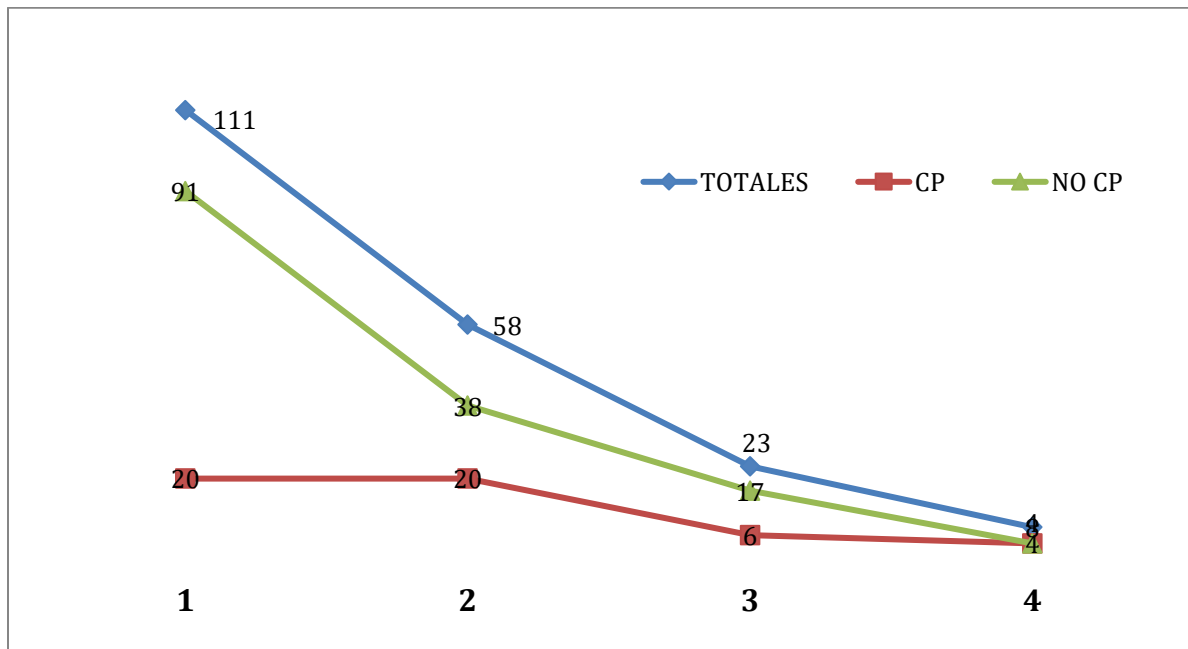


Figure I: Frequency of hospital admissions in the 2019-2020 period.

The total number of patients with NecPal criteria broken down into treated and untreated in the palliative care unit and their place of death are shown below.

Patients with NECPAL clinical criteria	Total patients admitted to the ICU	Total number of patients admitted to the ROOM	TOTALS
Treated in Palliative Care Unit	4	46	fifty
Not treated in palliative care unit	23	63	86
Totals	27	109	136

Table 5: Deaths in the ICU and ward according to exposure to palliative care unit treatment. Source: Own elaboration based on administrative data

The following table shows the total number of days that the patients were admitted to the different services before their death.

Total days of admission to the different services			
	days in CTI	Days in room	total days
Patients treated in palliative care	14	414	428
Untreated patients in palliative care	225	750	975
Totals	239	1164	1403

Table 6: Total days of admission to the different sanatorium areas.

Regarding the hospital stay before death, in the different areas, it was found that patients with palliative needs covered by the palliative care team used 14 days of hospitalization in the ICU and 414 days in the ward; while the patients seen

by their referring physicians required 225 days of care in the ICU and 750 days in the ward. Mean days of hospitalization in the ICU for patients treated in PC were 3.5 versus 9.7 for patients not treated in PC.

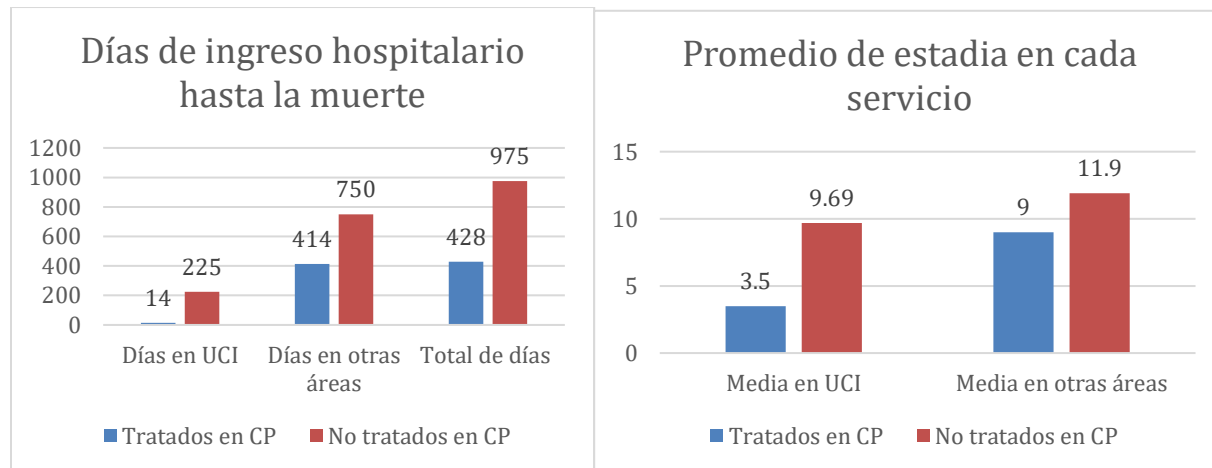


Figure II: Total days and average admission to each service.

Regarding the global deterioration of patients with clinical variables included in the NecPal 3.1 instrument, such as weight loss greater than 10%, dependence on Barthel or Karnofky less than 30, loss of two basic activities of daily living, loss of more than three points on Pfeiffer or global deterioration scale (GDS) greater than 6c. It was found that 19 (9.5%) of the deceased people presented it. Of this total, only 2 (10.5%) were in

the palliative care unit, the remaining 17 had not been admitted, and 3 of them died in the CTI.

Discussion

Of the total of 200 people studied, it was found that only 50 (25%) presented palliative care care. Predominance of the female sex with a mean age of 73.6 years. Following Mc Namara, the percentage eligible for palliative care is 0.5% of

the adult population.²⁴This makes us see that we are well below the theoretical uptake level.

The patients with palliative needs not covered, cared for by their referring physicians, who come to die at the sanatorium are 86 (63.2%) people. In an evaluation of admissions, in the 90 days prior to death, it was reported that 47% of patients attended the emergency department and were admitted to die.²⁵

When distributing by pathology, 62.8% of advanced cancer patients were included in palliative care, but in advanced non-cancer pathologies they were less than 5%. An observational study in 2018, in a hospital in Peru, showed that there were 22 hospital deaths due to cancer, 50% of which were attended by the palliative care unit.²⁶Similar percentages are presented, although somewhat higher in our center. Oncologists refer their patients to palliative care more frequently than other specialties.

Of the total of 200 people who died in the period, 71 (35.5%) of them died in the ICU and 129 (64.5%) in the general ward. According to the work of Moreira et al. Mortality in the ICU is between 5% and 35%, the results found reflect similar percentages at the end of life in the ICU. It was established that 26% of critically ill patients presented criteria for activation of care by the palliative care team.²⁷

Hospital admissions have been more frequent in patients seen by their referring physicians. The admission of patients not exposed to palliative care is 2.54 times more frequent than those exposed. The World Health Organization states that "early palliative care reduces unnecessary hospitalizations and the use of health services."²⁸

Of the total of 136 patients who met NecPal clinical criteria, 27 (19.8%) died in the ICU and 109 (80.2%) died on the ward. Of those who died in the ICU, 4 were exposed to palliative care, while 23 were not. Of those who died in the ward, 46 were exposed to palliative care and 63 were not. According to Hua et al., between 14% and 20% of ICU patients would be eligible for palliative care using common triggers.²⁹

The Relative Risk (RR) of dying in the ICU or the ratio of the incidence in those exposed to PC over those not exposed to PC in the population of deceased with NecPal clinical criteria is 0.30 (95% CI, 0.11 - 0.82). Since this risk is less than 1, it is interpreted that exposure to PC care has a protective effect against death in the ICU. Along

the same lines, O'Mahony et al. have shown that consultation with palliative care teams was associated with reduced admissions and futile maneuvering.³⁰Salama et al concluded that a palliative intervention related to planning resulted in a reduction in ICU admissions from 26% to 12%.³¹

The Odds Ratio (OR) is 0.24 (95% CI, 0.08 - 0.74), so the chance of dying in CTI is 4.17 times lower for those who are exposed to palliative care compared to those who are not. According to Fisher's test, p-value of 0.007.

To measure the association between death or exitus in the ICU and exposure to palliative care treatment, taking into account the stratification by other relevant variables, the Cochran-Mantel-Haenszel test was carried out. The adjusted odds ratio (OR) controlling for sex is 0.23 (95% CI, 0.08 - 0.73), so the chance of dying in the ICU is 4.34 times lower for those who died exposed to CP versus those not exposed, controlling for sex.

When controlling for deceased cancer and non-cancer patients, the adjusted odds ratio (OR) is 0.25 (95% CI, 0.06 - 0.97), representing a 4-fold lower chance of dying in the ICU for patients exposed to PCs versus those not exposed.

Having been admitted to the palliative care unit shows statistical significance, being a protective factor for death in the ICU. These data are consistent with those found by Penrod et al, published in 2006 with a 42% risk reduction, and by the same author in 2010.³², with a risk reduction of 44%. When stratified by the variables of gender or cancer patients, the data is not significant. Nipp et al in 2020 in patients randomized to outpatient skilled palliative care had a 14% absolute increase in 1-year survival relative to controls (56% vs 42%, $p < 0.001$).³³

Of the patients not admitted to the palliative care service with NecPal clinical criteria, 23 of them ended their lives in the ICU, with a total of 225 days of hospitalization, and an average stay of 9.69 days. There were 63 patients who died admitted to other areas, with a total of 750 days of hospitalization, and an average of 11.90 days. There is evidence of a significant difference in the days of hospitalization in the ward and ICU between those exposed and not exposed to palliative care. In the same direction Penrod et al. show that the direct costs of patients not exposed to palliative care are 5.85 times higher compared to palliative care. May et al demonstrated that the

cost reduction was greater in patients with multimorbidity³⁴, in the same sense, Bird et al demonstrated that the economic burden is eased on low-income populations at the end of life.³⁵

The application of palliative care to cancer patients demonstrated that in the last three to six months of life, patients with adequate symptom control use fewer resources, especially those generated by hospitalization.³⁶ Various investigations have shown an improvement in the quality of life, reduction of depression, the frequency of hospital admissions and visits to the emergency room.^{37 38 39 40}

Patients and families who are offered assistance and support services in palliative care in the year of death consume fewer resources from the hospitalization system and in unscheduled visits than those attended by their referral physicians. Savings rates in these groups can be anywhere from 4:1 to 8:1.⁴¹

The limitations of our study are related to its retrospective execution method, medical records that presented partial data, scant application of prognostic scales, analysis of a single healthcare center which cannot be extrapolated to the rest of the system, and standardized manual work that can lead to display or typing errors.

Conclusions

The research tries to put end-of-life patients in context. The benefit provided to patients by care

provided by a palliative medicine team is justified, granting a safeguard to autonomy. The information obtained confirms that care at this stage of life by a palliative care team is a way to improve the effectiveness and efficiency of the health system. With a finite budget, the change in the management of patients with advanced chronic diseases opens the discussion and promises to be an interesting challenge to continue research in this line. Attention by palliative care teams generates a better cost/benefit ratio, higher levels of satisfaction and fewer complaints.

Palliative care is provided according to the needs of the patient or their family, it is quality medical care, centered on the person. Despite this, the admission of the terminally ill to the hospital is a fact that occurs very often, whether due to emotional, social or clinical factors.

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Conflict of interest: Both authors work in the audited company, receive salary for their medical clinical work, independent work was allowed, there was no interference from the general management.

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