

Impact of the COVID-19 Pandemic on the Treatment of Cancer Patients at a Hospital in Peru

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Abstract

Background: The appearance of the new coronavirus, SARS-CoV-2, in Wuhan - China, in 2019 led to the declaration of a COVID-19 pandemic by the World Health Organization. Peru confirmed its first case on March 6, 2020, prompting a significant change in medical care.

Purpose: Our objective was to determine the impact of the COVID-19 pandemic on cancer treatment in Peru.

Methods: A retrospective analysis of hospital data from the National Institute of Neoplastic Diseases revealed substantial decreases in oncological treatments in 2020 compared to 2019.

Results: Oncological treatments involving bone marrow transplantation had a greater impact between the months of April and September, at -100% ($p=0.003$). However, treatments involving surgery in April (-95% [$p\leq 0.001$]), radiotherapy in May (-76% [$p=0.002$]) and chemotherapy in June (-71% [$p\leq 0.001$]) also showed significant impacts. Comparative analysis with international data revealed similar trends in cancer care interruptions in different countries. However, variations in the magnitude of the impact were observed, influenced by regional health policies and the severity of the pandemic.

Conclusions: The findings underscore the challenges cancer care providers face during public health crises, requiring adaptive strategies to ensure continued access to essential treatments. Addressing these challenges requires comprehensive public health responses to mitigate the impact of future crises on cancer care systems.

Keywords

COVID-19 impact, cancer patient, cancer treatment, public health, Latin America

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Data Availability Statement included at the end of the article

Introduction

In December 2019, a new coronavirus that primarily caused pneumonia was discovered in Wuhan, China. Due to its swift global dissemination, the World Health Organization (WHO) classified COVID-19 as a “public health emergency of international concern”.^{1,2} Peru confirmed its first case of COVID-19 on March 6, 2020. During the early months of the pandemic, health care facilities prioritized crisis management, leading to the closure of primary and specialized care centers, which play a role in cancer detection.³

In Latin American (LATAM) countries, ongoing challenges in cancer control efforts persist due to limited funding and uneven distribution of medical resources compared to those in high-income nations.^{2,4} The global COVID-19 pandemic has further exacerbated disruptions in cancer diagnosis and screening programs worldwide, disproportionately affecting middle- and low-income countries.^{5,6}

These circumstances have significantly impacted cancer patients, resulting in reduced access to necessary treatments and services.^{7,8} Therefore, this study aimed to assess the impact of the COVID-19 pandemic on cancer treatment for patients at the National Institute of Neoplastic Diseases (INEN) in Peru.

Methods

Public Data Recovery

This was a single-center based retrospective study that was carried out using de-identified Hospital indicator reports from the National Institute of Neoplastic Diseases (<https://www.inen.sld.pe/>). The data obtained consisted of the number of oncological treatments that involving chemotherapy, surgery, radiotherapy and bone marrow transplantation between January and December 2019 and 2020. The reporting of this study conforms to STROBE guidelines.⁹

Estimating the Impact of the COVID-19 Pandemic

A descriptive month-by-month comparison was carried out for the years 2019 and 2020. Subsequently, the impact of COVID-19 was calculated for each month of both years and expressed as a percentage. It was calculated with the following formula:

$$\text{Impact of COVID-19} = \left(\frac{\# \text{cases 2020} - \# \text{cases 2019}}{\# \text{cases 2019}} \right) \times 100$$

Statistical Analysis

The data were summarized in box plots for the median and interquartile range with 25th, 50th and 75th percentiles. Comparisons were made using the Mann-Whitney U test. Statistical significance was calculated at the $P < 0.05$ level.

Results

Between January 1 and December 31, 2020, we observed significant changes in the number of oncology treatments compared to 2019. The total number of treatments increased from 34,569 to 37,355 in January and from 18,895 to 34,997 in February. However, there was a substantial decline starting in March, with numbers falling from 34,352 to 21,057, and continuing to decrease sharply through the year. Specifically, the number of treatments decreased to 8032 in April, 9196 in May, 11,875 in June, 17,997 in July, 19,680 in August, 22,240 in September, 25,084 in October, 25,524 in November, and 24,448 in December.

The impact of the COVID-19 pandemic on various types of oncology treatments in 2020 was notable. For chemotherapy treatments, there was a decrease of -5% in January, -5% in February, -59% in March, -65% in April, -70% in May, -71% in June, -62% in July, -53% in August, -43% in September, -43% in October, -40% in November, and -31% in December, with a significant P -value of <0.001 . Surgical treatments experienced a different trend, with changes of -1% in January, 12% in February, -46% in March, -95% in April, -94% in May, -81% in June, -65% in July, -51% in August, -40% in September, -31% in October, -27% in November, and -17% in December, with a P -value of 0.001 . Radiotherapy treatments showed fluctuations with a -25% decrease in January, 4% in February, -31% in March, -68% in April, -76% in May, -70% in June, -62% in July, -51% in August, -44% in September, -40% in October, -34% in November, and -26% in December, with a P -value of 0.003 . Finally, bone marrow transplants exhibited a dramatic decline, with -53% in January, 0% in February, 25% in March, and a complete -100% reduction from April through September, followed by -80% in October, -54% in November, and -64% in December, with a P -value of 0.002 (Figures 1 and 2).

Discussion

The COVID-19 pandemic has created one of the most significant public health crises of this century. Unfortunately, several public health policies led to the limitation or cessation of oncological care during the first months of the pandemic.

We observed that the COVID-19 pandemic had an impact on chemotherapy treatment at the National Institute of Neoplastic Diseases (INEN) in 2020; we reported values of -59% in the month of March, -65% in April, -70% in May, and -71% in June, compared to secondary hospital management data from the National Institute of Neoplastic Diseases in 2019. However, a previous study by Vasquez-Rosas et al¹⁰ reported -8.3% between March and April, -6.3% in May, and -6.7% in June at the Oswaldo Cruz Foundation in Brazil. In contrast, at the general hospital of México was reported -79% of cases between March and April, -83% in

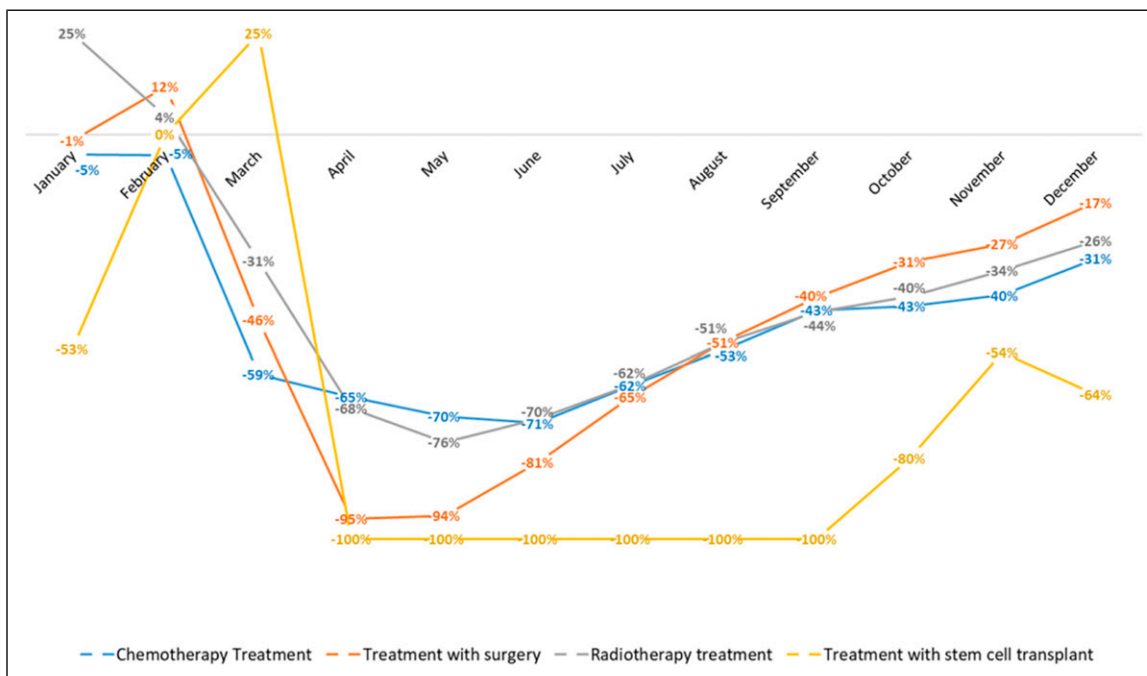


Figure 1. Monthly percentage reduction in treatment types from January to December 2020.

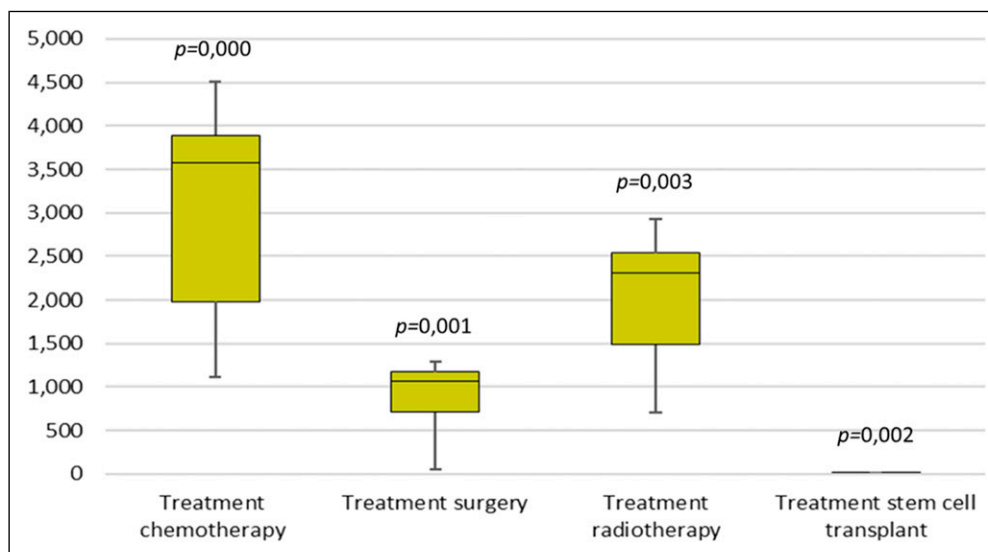


Figure 2. Comparative Analysis of Oncological Treatment Modalities (2019 vs 2020).

May, and -72% in June. On the other hand, data from the Cancer Institute of Mexico reported different percentages for the same period. They reported -27% between March and April, -34% in May, and -29% in June. In the case of the National Cancer Institute in Chile, it was reported a prevalence of -31% between March and April, -35% in May and -19% in June. In Uruguay, the study reported a prevalence of -11% between March and April, -22% in

May, and -20% in June with data from the oncological radiotherapy unit of the University of Uruguay. Amador¹¹ reported a prevalence of -9.5% between March and June from an oncology hospital in Spain, and Ambroggi¹² reported a prevalence of 10.6% between the months of January and February 2019 and 2020. Likewise, Vallejos¹³ reported an impact on treatment with -70% chemotherapy in June in Oncosalud, AUNA.

Similarly, we observed that there was an impact of the COVID-19 pandemic on surgical treatment at the INEN in 2020 of -46% in the month of March, -95% in the month of April, -94% in the month of May, and -81% in the month of June, compared to secondary hospital management data from the National Institute of Neoplastic Diseases in 2019. However, Vasquez-Rosas et al¹⁰ reported an impact of -24.9% between the months of March and April, -31.7% in May, and -23.6% in June in Brazil. In the case of Mexico, they reported an impact of -57% between March and April, -75% in May, -100% in June for the general hospital of Mexico; and -24% between the months of March and April, -55% in May, -30% in June for the Cancer Institute of the same country. In Chile was reported a percentage of -34% between the months of March and April, -33% in May and -38% in June. Ranganathan¹⁴ reported 52% between the months of January and May in a cancer center in India. Likewise, Vallejos¹³ reported an impact of -21% on chemotherapy treatment between March and June 2020 in Oncosalud, AUNA.

In the case of radiotherapy treatment, we observed an impact of -31% in the month of March, -68% in April, -76% in May, and -70% in June, when compared to secondary hospital management data from the National Institute of Neoplastic Diseases in 2019. However, a multicentric study carried out in Latin America showed a prevalence of -8% between the months of March and April in Brazil. Likewise, data analyzed from the Colombian League against Cancer reported a -8.9% in May and -18.6% in June. Similarly, it was reported a prevalence of -31% between the months of March and April, -35% in May and -19% in June at the National Cancer Institute in Chile. In the case of Uruguay, it was reported a -0.35% in the month of March, -0.68% in April, -0.75% in May and -0.70% in June.¹⁰ Morris et al¹⁵ reported a significant impact of 44% between the months of January 2019 and October 2020. Likewise, Vallejos¹³ reported an impact of -30% on chemotherapy treatment between March and June 2020 in Oncosalud-AUNA. Finally, we observed a greater impact of -100% between the months of April and September in 2020 for patients treated with bone marrow transplants ($P = 0.003$), compared to secondary hospital management data from the National Institute of Neoplastic Diseases 2019.

Several studies involving cancer patients who were infected with SARS-CoV-2 have already demonstrated that cancer is a serious risk factor for mortality and that it negatively impacts cancer patients' recovery.¹⁶⁻²² Thus, Infection risk differs between cancer patients depending on their genetic predisposition, physical condition, ethnicity, nutritional status, age and sex.²³

During the pandemic, individuals with cancer faced a notably higher risk of contracting SARS-CoV-2, making COVID-19 a particularly serious threat for these patients. A comprehensive meta-meta-analysis conducted by Arayici et al.²⁴ incorporating data from 20 studies with a total of 1,031,783 participants, found that patients with COVID-19 had an elevated likelihood of developing severe symptoms. Specifically, cancer patients who contracted SARS-CoV-2 exhibited a higher mortality risk (OR = 2.02, 95% CI: 1.74-

2.35, $P < 0.001$). Furthermore, there was a marked increase in ICU admissions among cancer patients with COVID-19 (OR = 1.84, 95% CI: 1.44-2.34, $P < 0.001$). Another meta-analysis, encompassing 58 studies with 709 908 participants, including 31 732 cancer patients, indicated significantly higher rates of both mortality and ICU admissions for cancer patients (RR = 2.26, 95% CI: 1.94-2.62, $P < 0.001$; RR = 1.45, 95% CI: 1.28-1.64, $P < 0.001$, respectively).²⁰ Nonetheless, it is important to recognize that several studies have found no substantial difference in COVID-19 mortality between cancer patients and those without cancer.²⁵⁻²⁷

This study has some limitations. Firstly, it cannot predict the effects of delays in new cancer diagnoses, treatments, and disease re-staging on cancer prognosis because it is a monocentric and retrospective study. This limitation restricts us from generalizing the findings to other populations or clinical settings. Secondly, the study does not evaluate patients' demographic characteristics, which could introduce biases in interpreting the results, as factors such as age, gender, and socioeconomic conditions may influence the observed outcomes.

Conclusion

The COVID-19 pandemic has disrupted the delivery of cancer care across Latin American (LATAM) countries in various ways, including significant setbacks in cancer screening and diagnosis programs, and delays or cancellations in treatments of cancer. These disruptions have resulted into a higher proportion of cancer cases being diagnosed at more advanced stages and have contributed to excess mortality in specific cancer types.

Before the pandemic, LATAM countries were already facing health care system limitations and barriers to accessing medical resources. This research underscores the need to prioritize strategies for safeguarding and reinforcing cancer care delivery. Furthermore, addressing the vulnerabilities highlighted by the COVID-19 pandemic, will be crucial for mitigating adverse effects during future global health crises.

Declaration of Conflicting Interests

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

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Ethics Statement

Due to its retrospective design, which included analysis of secondary sources, the present study was exempted from the requirement of ethics approval by the Ethics Committee of Universidad Privada San Juan Bautista (registration code: 1320-2024-CIEI-UPSJB).

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Data Availability Statement

The datasets generated and analyzed during this study are available in the Dryad platform https://datadryad.org/stash/share/bA2M_lfrZo8bLXLqVzd77qM5-phck7yDTe3GSuv4ZxU

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