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Cancer diagnosis in Brazil in the COVID-19 era

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ABSTRACT

The comprehensive care and treatment for cancer patients in Brazil, regulated by the National Cancer Prevention and Control Policy, is provided by Brazilian Unified Healthcare System (SUS) in certified health institution. Due the COVID-19 pandemic, several restrictive measures have been implemented by the State federation's governments, and cancer diagnosis reference centers were also impacted by these measures. Thus, this study aimed to compare SUS-oriented cancer diagnosis in Brazil before and during the pandemic so far. The average number of cancer diagnoses has dropped considerably in all Brazilian Regions since the pandemic period started. The number of new cancer cases has plunged in all regions, ranged from –24.3% in the North to –42.7% in Northeast region. The overall Brazilian average deficit reached 35.5%, corresponding to about 15,000 undiagnosed cases of cancer monthly. The pandemic period has dramatically reduced the diagnosis of new cases of cancer in Brazil, since consultations in public health services were compromised by restrictive measures. Therefore, effective measures must be urgently put in action in order to minimize the damage, and consequently, the negative health impacts caused by the COVID-19 pandemic in the care of cancer patients.

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Introduction

The coronavirus disease (COVID-19), caused by the virus SARS-CoV-2, was detected in Brazil on February 26, 2020 approximately 2 months after the first case have been reported in China. The first death by COVID-19 in Brazil occurred on March 17, 2020 when the disease had already turned into a pandemic [1]. The COVID-19 pandemic has severely impacted health systems worldwide [2], affecting the care of various chronic diseases, including cancer diagnosis and treatment [3,4]. Recent studies have shown the effects of COVID-19 on health professionals' routinely responsible for diagnosing and treating patients with cancer [5–8]. A set of security measures has been proposed to relieve this problem, even so it is an alarming situation [9–11].

Brazilian Unified Healthcare System

The Brazilian Unified Healthcare System (Sistema Único de Saúde, SUS) is the world largest universal healthcare system, funded by federal, state, and municipal resources and serves over 209,000 million inhabitants (<https://censo2010.ibge.gov.br>) (accessed in October 2020). Qualifying the service network and guaranteeing access to users is a daily challenge faced by SUS managers, whom, in 2011, developed the largest institutional evaluation program of its history, the Access and Quality Improvement Program (PMAQ) (http://189.28.128.100/dab/docs/portaldab/documentos/instrumento_ae_sb.pdf) (accessed in October 2020). SUS decentralization provided more focused evaluation of regional health problems and identified involved health determinants, thus allowing adequate management aimed at population needs.

These characteristics provide municipalities with more power and concomitant responsibility, which makes planning essential and situational, as opposed to the centralized and normative planning of public management in effect until 1990. However, due to daily work required demands, this practice is sometimes neglected and actions are improvised to solve emerging problems

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Table 1

Summary of literature about general cancer diagnosis in the COVID-19 pandemic compared to previous periods.

Author / Reference	Country	Data analyzed	Findings	Comment
De Vincentiis et al 2020	Italy	<ul style="list-style-type: none"> This study analyzed the number of cytopathological and histopathological diagnosis of primary and metastatic malignancies, made between the 11th and the 20th weeks of 2020, corresponding to the most severe lockdown period, in comparison to average number of diagnosis in the same period of 2018 and 2019 	<ul style="list-style-type: none"> The diagnosis of new metastatic malignancy and pancreatic cancer increased, Different types of cancer exhibited various levels of reduction in the number of diagnosis. Colon-rectum (62%), bladder (66%) and prostate (75%) cancer experienced the greatest reduction 	<ul style="list-style-type: none"> The authors were concerned about the decrease in the number of diagnosis of colon-rectum cancer (CRC) (62%), due to the higher risk of death with this type of cancer, independent of tumor stage or interval between the diagnosis to treatment interval. Corrective actions are recommended for CRC, such as: triage of patients by family physicians according to standard guidelines and reintroduction of mass screening through fecal occult blood testing,
Ferrara et al 2020	Italy	<ul style="list-style-type: none"> Compared the number of pathologic diagnosis of malignant lesions, at seven anatomic pathology units serving secondary care hospitals, during the most severe lockdown period (11th to 20th week of the year) in northern-central Italy with the same period of 2018 and 2019 	<ul style="list-style-type: none"> The average number of recorded of cancer diagnosis fell 44.9% in 2020, compared to the previous periods Skin cancers represented the main undiagnosed lesions (56.7%), followed by colorectal (46.6%), prostate (45%), and bladder (43.6%) cancer. High-grade prostate tumors were not strongly affected by the lockdown period, with a 21.7% drop in diagnosis 	<ul style="list-style-type: none"> The most severe lockdown period in Italy affected the diagnosis of malignant lesions, mostly of skin, colorectal, and invasive bladder cancer The authors pointed out the importance of resuming mass screening programs, as well as the institution of corrective actions, mainly for the diagnosis of colorectal cancer and invasive bladder cancer
Kaufman et al 2020	USA	<ul style="list-style-type: none"> Weekly changes in the number of patients with newly identified cancer before and during the COVID-19 pandemic Study included 278,778 patients, 258,598 (92.8%) from the baseline period and 20,180 (7.2%) from the COVID-19 period Six cancers were investigated: breast, colorectal, lung, pancreatic, gastric, and esophageal cancer. 	<ul style="list-style-type: none"> During the pandemic, weekly numbers fell 46.4% for the 6 cancers combined, with significant declines in all cancer types, ranging from 24.7% for pancreatic cancer (from 271 to 204; $P = .01$) to 51.8% for breast cancer (from 2208 to 1064; $P < .001$) 	<ul style="list-style-type: none"> The interruption of medical services and the reduction in assiduity of patients during the social isolation period can compromise the diagnosis of cancer To minimize this situation, the authors suggested urgent planning, including the use of digital technology, such as the practice of telehealth and virtual interactions between healthcare professionals and patients
Maluchnik et al 2020	Poland	<ul style="list-style-type: none"> Since 2015, patients in Poland with suspected neoplastic diseases receive a DiLO card. This investigation included data referring to all oncological patients in Poland, registered by The National Health Fund from the beginning of the DiLO program to 25 May 2020 	<ul style="list-style-type: none"> During the pandemic period analyzed, the distribution of DiLO cards decreased by 33% compared to the same period of the previous year, mainly in primary care. Due to the difficulty of accessing cancer diagnostic tests during the COVID-19 pandemic, the number of preliminary diagnosis and extended diagnostic procedures decreased by 31% and 19%, respectively, in 2020 compared to 2019. 	<ul style="list-style-type: none"> The authors suggest disclosing information to make patients aware that the risk of delaying diagnosis and treatment of cancer is more damaging than a possible COVID infection The restrictive measures of COVID-19 pandemic affected oncological treatments in Poland. This investigation highlights the role of telemedicine and virtual consultations to mitigate the limitations of this period
Zadnik et al 2020	Slovenia	<ul style="list-style-type: none"> Monthly changes in the number of cancer notifications before and during the COVID-19 pandemic Analyzed data were extracted from the Slovenian Cancer Registry, the e-referral system of Slovenia managed by the National Institute of Public Health (NIPH), and the Institute of Oncology Ljubljana 	<ul style="list-style-type: none"> Compared to November 2019–February 2020 average, the decrease in April was respectively about 43% and 29% for histopathological and clinical cancer notifications In the same period, the average decrease in first outpatient visits was 19%, 43% and 20% at the radiotherapy, surgery and medical oncology sectors. 	<ul style="list-style-type: none"> The authors conclude that significant drops in oncological referrals, outpatient visits, imaging exams, as well as, in the cancer notifications, may point to a delay in diagnosis and treatment of cancer during the COVID-19 period in Slovenia

(continued on next page)

Table 1 (continued)

Author / Reference	Country	Data analyzed	Findings	Comment
Marques et al 2020 (Current study)	Brazil	<ul style="list-style-type: none"> Monthly average of new cancer cases diagnosed in 2019 compared to the monthly average of January – August of 2020 Data extracted and analyzed from the public database of Brazilian Public Health System (DATASUS) 	<ul style="list-style-type: none"> This study included the average of 69,404 cancer diagnosis monthly, 42,186 (60.78%) of which registered in 2019, and 27,218 (39.21%) from the COVID-19 period The number of new cancer cases has plunged in all Brazilian regions, this drop ranged from 24.3% and 42.7% in the North to Northeast region, respectively. The overall Brazilian average deficit reached 35.5%, corresponding to about 15,000 undiagnosed cases of cancer monthly 	<ul style="list-style-type: none"> The pandemic period has considerably harmed the diagnosis of new cases of cancer in Brazil, as a consequence of restrictive measures in public health services, or even for patient insecurities Effective measures must be implemented to minimize the negative impact caused by the COVID-19 pandemic, in the care of cancer patients

[11]. This management weakness limits our capacity to respond to critical cases, which is very heterogeneous across the 26 States and Federal District [1,12]. Regarding oncology treatment, the National Cancer Prevention and Control Policy regulates comprehensive care for patients in a regionalized and decentralized way and ensures that cancer treatments administered by SUS are performed in certified health institutions as the High Complexity Assistance Unit in Oncology (UNACON) or the High Complexity Assistance Center in Oncology (CACON (<https://www.inca.gov.br/onde-tratar-pelo-sus>)) (accessed in October 2020).

Effects of COVID-19 on public health assistance

Due to COVID-19, several restrictive measures have been implemented by the governments of the various states of federation, such as physical distancing, leisure areas, and closure of nonessential commerce in order to reduce the rate of contamination. Cancer diagnosis referral centers were also impacted by these measures [1,3,13,14]. Interestingly, Alves et al (2020) [3] revealed a considerable reduction in follow-up and treatment consultations of oral cancer patients at 3 reference cancer centers located respectively in Brazil, Canada, and the United States, comparing the first 6 weeks of the restrictive measures with the 6 weeks prior to the pandemic period. Thus, the aim of this study was to compare SUS-oriented cancer diagnosis in Brazil before and during the pandemic to date.

Summary of literature

A computerized search was performed in the “PubMed” database. The research descriptors used were “CANCER,” “COVID-19,” AND “DIAGNOSIS.” Two examiners reviewed the initial list of articles and applied inclusion criteria to determine the final sample of articles.

The inclusion criteria for selecting articles were studies that compared general cancer diagnosis data from the pandemic period with previous periods, published from March 2020, in English, with full text available. Studies that did not assess the pandemic period or were restricted to a specific single cancer type were excluded.

Initially, 163 articles were found using the descriptors. After reading the abstracts, 20 studies remained for analysis of inclusion criteria. Then, after reading the full text of these studies, only 5 articles [15–19] were selected for discussion in Table 1.

Table 2

Difference between the monthly average of cancer diagnosis (excluding oral cancer), performed in all geographical Regions from Brazil of 2019 compared to January–August of 2020.

Regions of Brazil	2019 (n)	2020 (n)	Difference (n) (%)
North	1,454	1,101	–353 (24.3)
Northeast	10,113	5,798	–4,315 (42.7)
Southwest	17,688	11,560	–6,128 (34.6)
South	10,276	7,102	–3,174 (30.9)
Midwest	2,654	1,655	–999 (37.6)
Total	42,186	27,218	–14,968 (35.5)

Impact of COVID-19 on cancer diagnosis in Brazil

In order to assess the impact of the COVID-19 pandemic in Brazil, we compared the monthly average of new cancer cases diagnosed in 2019 to the monthly average of January–August of 2020, from the 5 geographic Regions of Brazil (North, Northeast, Southeast, South, and Midwest), representing the Brazilian States (26 States and the Federal District), through data extracted and analyzed from the public database of SUS (DATASUS)(http://tabnet.datasus.gov.br/cgi/dhdat.exe?PAINEL_ONCO/PAINEL_ONCOLOGIABR.def). In Brazil, mandatory notification of cancer began in 2018, with effect from 2019. Thus, searches carried out before 2019 are not representative (<https://legis.senado.leg.br/norma/27410223>) (accessed in October 2020).

Table 2 shows the negative impact from the COVID-19 pandemic in the diagnosis of cancer in Brazil. The average number of cancer diagnosis has dropped considerably in all Brazilian Regions since the pandemic period started. The number of new cancer cases has plunged in all regions, with the fall in new cancer diagnosis ranging from –24.3% in the North to –42.7% in Northeast region. The overall Brazilian average deficit reached 35.5%, corresponding to about 15,000 undiagnosed cases of cancer monthly. The long-term impact of these indicators on the diagnosis and treatment of cancer patients in the Brazilian population remains uncertain.

Just as an example, when analyzing the situation of cancer in the country, the numbers are worrying, since the decrease of consultations. The number of new cases of cancer expected for Brazil for each year of the triennium 2020–2022 would be 387,980 cases in men and 297,980 in women. These values correspond to an estimated risk of 371.11 new cases per 100,000 men, and for women, it corresponds to 277.11 for every 100,000 (<https://www.inca.gov.br/estimativa>).

Brazil has seen approximately 6.2 million cases of COVID-19 and over 172,500 deaths currently (November 28, 2020)

(<https://covid.saude.gov.br/>), and the end of the pandemic cannot yet be predicted, which leads us to believe that more patients undergoing cancer treatment or undiagnosed cases will still be affected by this critical period. One of the best alternative care approaches for patients with cancer during the COVID-19 pandemic is the telemedicine practice, which was recently regularized in Brazil. This approach allows communication at a distance between health professionals, assisting in diagnosis and case discussions [20].

Conclusion

The pandemic period has dramatically reduced the diagnosis of new cases of cancer in Brazil, possibly due to the restrictive measures including limitation of consultations in public health services. Therefore, effective measures must be urgently put in action in order to minimize the damage, and consequently, the negative health impacts caused by the COVID-19 pandemic in the care of cancer patients.

Author contribution

Nelson Pereira Marques: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Roles/Writing - original draft; Writing - review & editing. **Denise Maria M. Silveira:** Conceptualization; Data curation; Formal analysis; Methodology. **Nádia Carolina Teixeira Marques:** Formal analysis; Investigation; Methodology; Writing - review & editing. **Daniella Reis Barbosa Martelli:** Conceptualization; Formal analysis; Writing - review & editing. **Eduardo A. Oliveira:** Formal analysis; Investigation; Methodology; Writing - review & editing. **Hercílio Martelli-Júnior:** Conceptualization; Formal analysis; Methodology; Project administration; Supervision; Roles/Writing - original draft; Writing - review & editing.

All authors have contributed to writing and reviewing of the manuscript. All authors approved the final manuscript. NM and HMJ contributed to conceptualization. All authors contributed to collection of included papers.

Conflicts of interest

Authors do not have any commercial or financial conflict of interest.

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