Impact of COVID-19 on cancer care in India: a cohort study

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Summary

Background The COVID-19 pandemic has disrupted health-care systems, leading to concerns about its subsequent impact on non-COVID disease conditions. The diagnosis and management of cancer is time sensitive and is likely to be substantially affected by these disruptions. We aimed to assess the impact of the COVID-19 pandemic on cancer care in India.

Methods We did an ambidirectional cohort study at 41 cancer centres across India that were members of the National Cancer Grid of India to compare provision of oncology services between March 1 and May 31, 2020, with the same time period in 2019. We collected data on new patient registrations, number of patients visiting outpatient clinics, hospital admissions, day care admissions for chemotherapy, minor and major surgeries, patients accessing radiotherapy, diagnostic tests done (pathology reports, CT scans, MRI scans), and palliative care referrals. We also obtained estimates from participating centres on cancer screening, research, and educational activities (teaching of postgraduate students and trainees). We calculated proportional reductions in the provision of oncology services in 2020, compared with 2019.

Findings Between March 1 and May 31, 2020, the number of new patients registered decreased from 112 270 to 51 760 (54% reduction), patients who had follow-up visits decreased from 634 745 to 340 984 (46% reduction), hospital admissions decreased from 88 801 to 56 885 (36% reduction), outpatient chemotherapy decreased from 173 634 to 109 107 (37% reduction), the number of major surgeries decreased from 17 120 to 8677 (49% reduction), minor surgeries from 18 004 to 8630 (52% reduction), patients accessing radiotherapy from 51 142 to 39 365 (23% reduction), pathological diagnostic tests from 398 373 to 246 616 (38% reduction), number of radiological diagnostic tests from 93 449 to 53 560 (43% reduction), and palliative care referrals from 19 474 to 13 890 (29% reduction). These reductions were even more marked between April and May, 2020. Cancer screening was stopped completely or was functioning at less than 25% of usual capacity at more than 70% of centres during these months. Reductions in the provision of oncology services were higher for centres in tier 1 cities (larger cities) than tier 2 and 3 cities (smaller cities).

Interpretation The COVID-19 pandemic has had considerable impact on the delivery of oncology services in India. The long-term impact of cessation of cancer screening and delayed hospital visits on cancer stage migration and outcomes are likely to be substantial.

Funding None.

Introduction

As of May 12, 2021, according to WHO, the COVID-19 pandemic has affected 222 countries and territories, with more than 159 million cases and more than 3·3 million deaths reported. The COVID-19 pandemic has resulted in widespread mortality and has exposed the frailties of health-care systems worldwide. National responses have varied by country, with restrictions or lockdowns of varying severity implemented to curb the pandemic, with different outcomes. There are concerns that several areas of health care, such as infant and maternal health, immunisation, and non-communicable diseases could be adversely affected by the pandemic.[1,2] The reasons for these adverse consequences are multifactorial: health systems have been overwhelmed due to the prioritisation of COVID-19 treatment over other diseases and the fear of COVID-19 transmission both among the general public and health-care providers has prevented care seeking. These effects are likely to be further compounded by the logistical challenges imposed on patients due to national and regional lockdowns and the economic slowdown and potential loss of wages.

On Jan 30, 2020, the first case of COVID-19 was reported in India, and as of May 12, 2021, according to WHO, almost 23 million people had been infected. In response to the pandemic, the Government of India

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For the Hindi translation of the abstract see Online for appendix 1

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Research in context

Evidence before this study

The COVID-19 pandemic has caused more than 3·3 million deaths worldwide, has burdened health-care systems, and has affected the capacity of such systems to treat non-COVID conditions. Globally, several cancer centres and societies have reported substantial decreases in the number of patients diagnosed with and treated for cancer during the pandemic. We searched PubMed for studies published between Feb 1, 2020, and Jan 31, 2021, which reported actual numbers of reductions, delays, or disruptions in cancer care during the pandemic, using the search terms "COVID-19" or "pandemic" combined with "cancer", "oncology" "cancer care" "cancer screening" or "cancer diagnosis". We included studies irrespective of cancer type, type of care (screening, diagnostic or treatment), and modality of management (surgery, radiotherapy, chemotherapy, combination). We also searched the reference lists of identified studies to identify other relevant references. We identified several studies, both from high-income and low-income countries suggesting that globally, there has been a reduction in the provision of cancer services during the pandemic; however, most studies had small sample sizes, were single centre studies, or were surveys or estimates (without real-life data). We identified no large-scale, nationally representative studies of the overall impact of the pandemic on all aspects of cancer management.

Added value of this study

To our knowledge, this is one of the largest multicentre studies to date to assess the impact of the COVID-19 pandemic on cancer care worldwide. This study included 41 high volume centres, which treat 450 000 new patients annually (accounting for more than a third of all patients with cancer in India). Additionally, we included raw data on the number of patients treated during the pandemic, rather than estimates or models, and we assessed the impact of the pandemic and resulting lockdown on a wide range of cancer services (diagnosis, treatment, palliation, screening, education, and research). The participating centres represented various types of institutes from all parts of India.

Implications of all the available evidence

The results of our study quantify the true impact of the pandemic and measures such as the national lockdown on overall provision of cancer care in India. Our data show that cancer management during the pandemic has been substantially affected in India, where the majority of the population has inadequate access to cancer care. Smaller studies from other low-income and middle-income countries indicate that this poor access to cancer care is a common problem; future research should focus on presentation of cancer at more advanced stages of disease as a consequence of the inability to access care, and the resultant adverse oncological outcomes. Cancer care organisations should ensure availability and access to care in response to situations such as the current COVID-19 pandemic.

instituted a series of nationwide lockdowns that began on March 24, 2020, with severe restrictions imposed on inter-state and intra-state travel. Some cancer centres were partially or completely converted to COVID-19 treatment facilities. Data from cancer centres across the world have shown that the provision of oncology services has been considerably reduced during the COVID pandemic.[3–5] Projections from many countries indicate increases in mortality in the next 5–10 years due to delays in diagnosis for several different cancer types.[6–8] In India, around 1·32 million patients are diagnosed with cancer annually[9] and cancer accounts for 8% of all deaths in the country.[10] Considerable disparities exist in cancer care in urban and rural areas.[11–13] Travel restrictions during the first peak of the pandemic are likely to have affected access to care, especially for individuals in rural areas who are dependent on urban centres for cancer care.

The National Cancer Grid of India is a large network of more than 230 cancer centres and research institutions, which provides more than 60% of cancer care in India. The National Cancer Grid strongly recommended the continuation of cancer care early in the course of the pandemic. The National Cancer Grid also suggested strategies to prioritise treatment and to modify existing protocols to optimise strained resources and to reduce risks to patients. Globally and in India, real-world data about the true impact of the COVID-19 pandemic on cancer services at a national scale is scarce. We aimed to assess the impact of the COVID-19 pandemic on the provision of oncology services across 41 high volume cancer hospitals in India.

Methods

Study design and participants

We did an ambidirectional cohort study at 41 cancer centres across India that were members of the National Cancer Grid of India (table 1; appendix 2 pp 1–2). We collected data on new patient registrations, number of patients visiting outpatient clinics for follow-up, hospital admissions, day care admissions for chemotherapy, minor surgeries (surgical and endoscopic procedures that do not require hospital admission) and major surgeries (surgical and endoscopic procedures that require hospital admission), patients accessing radiotherapy, diagnostic tests done (pathology reports, CT scans, MRI scans), and palliative care referrals. Additionally, we obtained estimates from participating centres on cancer screening, research, and educational (teaching of postgraduate students and trainees) activities in these centres. This study was exempt from Ethics

Committee approval due to the nature of the study and used only de-identified data or estimates.

Data collection and analysis

We collected data between March 1 and May 31, 2020, and for the period March 1 to May 31, 2019. Data were collected from each centre by institutional staff from their electronic medical records, appointment visit logs, patient notes, and service registries. Centres provided estimates on reductions in screening, educational, and research activities (<25%, 25–50%, 50–75%, or >75% reduction), and not actual numbers. For centres that had oncology departments in a general hospital, we collated data specific for oncology services. If institutes could not provide oncology-specific data for a particular service, they were excluded from the analysis for that field. We also collected data on whether cancer centres used a conscious staff sparing strategy (ie, staff working at different times to minimise exposure and protection of clinically vulnerable staff), whether they increased their use of teleconsultations or video consultations, and the changes in hospital income during these months. We analysed data comparing patient numbers between March and May, 2020, with corresponding months in 2019. We also compared patient numbers in the months of April and May, 2020, when the lockdown and restrictions were most stringent, with the same months in 2019. We also analysed the data based on the classification of cities (tier 1 *vs* tier 2 *vs* tier 3) to assess whether systematic differences exist in the magnitude of changes in provision of services. Cities are classified as tier 1, 2, and 3 by the Government of India on the basis of the population density of the city and infrastructure facilities (tier 1 cities are larger cities, and tier 3 smaller cities).[14] Descriptive statistics were used to summarise the data.

We estimated the total number of missed diagnoses, the potential number of patients oncology services would have to treat to catch up with the backlog, and the number of additional deaths expected in India. These estimates were based on overall data from all participating centres and additional data from some of the participating centres 3 months after the national lockdown was lifted in September, 2020 (when the number of new cancer diagnoses had returned to 90% of pre-COVID-19 numbers), and assumptions by the National Cancer Grid of India that graded lifting of lockdown enabled a linear increase in diagnoses. Additionally, we assumed two scenarios: scenario 1 (best case), where half of patients with missed diagnoses in the participating centres would have accessed care in other centres, a quarter would present with more advanced stage disease, and a quarter would have a missed diagnosis; and scenario 2 (worst case), where a third of patients with missed diagnoses in the participating centres would have accessed care in other centres, a third would present with more advanced stage disease, and a third would have a missed diagnosis.

	Sites (n)
Location	
North	9
East	3
Northeast	3
South	13
West	13
City classification	
Tier 1	14
Tier 2	17
Tier 3	10
Oncology-specific centre	
Yes	21
No	20
Health-care sector	
Public	14
Charitable	14
Private	13

Full details of participating centres are provided in the appendix 2 (pp 1–2).

Table 1: **Participating National Cancer Grid of India cancer centres**

The number of additional deaths were estimated from national incidence and mortality data for all cancers.[9]

Role of the funding source

There was no funding source for this study.

Results

Between March 1 and May 31, 2020, a substantial decrease in patient numbers was observed across all oncology services compared with the same period in 2019 (table 2). The largest decrease was observed in the number of new patient registrations from 112 270 to 51760 (54%). The reduction in the number of patients receiving radiotherapy and palliative care were less marked than for the other services. For the period April to May 2020, the overall reduction in patient numbers across all oncology services was even more marked when compared with the same period in the previous year, especially for new patient registrations, total outpatient visits, and surgeries, which reduced by more than 60% (table 2). The percentage reduction in the number of patients accessing oncology services was higher in tier 1 cities than in tier 3 cities, with 50–75% reductions observed in almost all services provided in cancer centres in tier 1 cities between April 1 and May 31, 2020 (table 3). The reductions in patient numbers were larger during April 1 to May 31, 2020 versus 2019, than during March 1 to May 31, 2020 compared with 2019 (appendix 2 pp 3–8). Public and charitable hospitals had larger reductions in patient numbers than did private hospitals between March and May, 2020, when comparted with the same period in 2019 (appendix 2 pp 1–2, 10). No clear differences in patient numbers were identified between oncology-specific centres and multispecialty hospitals (appendix 2 p 11).

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For the **WHO Coronavirus (COVID-19) Dashboard** see https://covid19.who.int/

For more on the **National Cancer Grid of India** see https://tmc.gov.in/ncg

See Online for appendix 2

	Number of centres that provided data	March–May, 2019, n	March–May, 2020, n	Percentage reduction*	April–May, 2019, n	April–May, 2020, n	Percentage reduction*
New patient registrations	40	112270	51760	54%	75725	24977	67%
Total outpatient clinic visits	37	634745	340984	46%	435577	167032	62%
Hospital admissions	39	88801	56885	36%	60190	31685	47%
Major surgeries	38	17120	8677	49%	11563	4245	63%
Minor surgeries	36	18004	8630	52%	12229	3677	70%
Outpatient chemotherapy	40	173634	109107	37%	116584	60154	48%
Patients undergoing external beam radiotherapy	37	51142	39365	23%	34558	19183	44%
Imaging reports (CT and MRI)	31	93449	53560	43%	62763	26961	57%
Pathology reports	32	398373	246616	38%	269238	127554	53%
Palliative care referrals	27	19474	13890	29%	13694	6671	51%

*Compared with the same period in 2019.

Table 2: **Provision of hospital oncology services between March 1 and May 31, 2020, compared with the same period in 2019 across all participating centres**

	Percentage reduction in patient numbers (March 1–May 31)*			Percentage reduction in patient numbers (April 1–May 31, 2020)*		
	Tier 1	Tier 2	Tier 3	Tier 1	Tier 2	Tier 3
New patient registrations	59%	52%	46%	75%	61%	58%
Total outpatient clinic visits	55%	42%	28%	70%	54%	50%
Hospital admissions	40%	33%	32%	52%	43%	36%
Major surgeries	51%	48%	37%	66%	60%	41%
Minor surgeries	57%	31%	46%	76%	46%	57%
Outpatient chemotherapy	44%	29%	28%	57%	36%	35%
Patients undergoing external beam radiotherapy	9%	20%	35%	23%	28%	50%
Imaging reports (CT and MRI)	46%	40%	42%	60%	53%	51%
Pathology reports	35%	40%	44%	52%	51%	55%
Palliative care referrals	32%	31%	9%	59%	41%	–7%

*Compared with the same period in 2019. Actual patient numbers are provided in the appendix 2 (pp 3–8).

Table 3: **Percentage reductions in provision of hospital oncology services between 2020 and 2019, by city classification**

Our estimates based on results from scenarios 1 and 2 indicate that these declines in cancer service usage will result in 83600 to 111500 missed diagnoses, lead to 83600 to 111500 patients requiring oncology services for more advanced disease in the next 2 years, and 98650 to 131500 excess cancer-related deaths occurring in the next 5 years.

32 (78%) of 41 centres provided data on activities associated with screening, research, and educational activities (appendix 2 p 9); 22 (69%) of 32 centres had stopped or substantially reduced cancer screening activities from March to May, 2020, compared with the same period in 2019. Substantial reductions in research activities were observed in 22 (69%) of 32 centres, and marked reductions in educational activities were reported in 18 (56%) centres. 36 (88%) of 41 centres provided data on staff sparing strategies and teleconsultations or video consultations: 31 (86%) of 36 centres implemented a conscious staff sparing strategy during March to May, 2020, and 24 (67%) centres initiated teleconsultations or video consultations to help mitigate the reductions in outpatient services. 29 (71%) of 41 centres reported data on income changes; 20 (69%) of 29 centres reported substantial declines (50–75%) in hospital income between April and May, 2020; a higher proportion of charitable hospitals (11 [85%] of 13) and private hospitals (seven [75%] of ten) reported a decrease in hospital income than did public hospitals (two [33%] of six).

Discussion

The results of our study done at 41 high volume cancer centres in India showed considerable reductions in the provision of oncology services between March and May, 2020 compared with the corresponding time period in 2019. The reduction was the largest for new patient registrations, outpatient services, hospital admissions, and major surgeries, and less marked for radiotherapy and palliative care. Reductions were highest in April and May, 2020, when the lockdown measures were most stringent. Considering that the national lockdown was announced on March 24, 2020, the lower patient numbers in March were more likely due to fear of infection, whereas reductions in April and May are likely to reflect a combination of fear of infection and the logistical restrictions due to the lockdown. Larger reductions in patient numbers were observed in major cancer centres located in larger metropolitan cities than in smaller cities. Our estimates of missed cancer diagnoses, delayed diagnoses, and subsequent burden on health-care services and the probable overall impact on cancer mortality indicate the possibility of a serious public health problem in the next 5 years. Education and training sessions for oncology and allied trainees were held less frequently than the same period in 2019 in most centres. Cancer research activities also decreased compared with the pre-COVID-19 period. Overall, cancer

care services decreased considerably across centres regardless of geographical location or city classification. Many centres adopted teleconsultations and video consultations quickly to mitigate the effects of these reductions in hospital outpatient visits, and most centres also had reduced incomes during these months.

Cancer represents a complex set of conditions with outcomes that are dependent on the timing of diagnosis and treatment. The ability to provide cancer services during the pandemic has been affected in several ways.[15] Many oncology centres have restructured their services to create COVID-19 units. There have been reductions in staffing due to re-deployment, infection, quarantine, or as a deliberate staff-sparing strategy.[16] Access to health-care facilities has been restricted due to travel restrictions and unwillingness of patients to visit hospitals because of fears about exposure to SARS-CoV-2. Health-care resources have been diverted to facilitate the management of COVID-19. This diversion of resources has led to concerns about possible delays in cancer diagnosis and management which, for many cancers, are known to affect oncological outcomes.

Global data show that during the COVID-19 pandemic, there has been a reduction in the number of patients accessing cancer services across countries, irrespective of income status.[3–5,17–19] The COVIDSurg collaborative estimated that across the world, 37% of cancer surgeries were cancelled during the peak 12 weeks of the COVID-19 pandemic.[17] Projections from Cancer Research UK indicate a backlog of 2·4 million people in the UK awaiting cancer screening or care, with decreases in the number of cancer surgeries and chemotherapy sessions done.[18] A survey of 155 countries by WHO found that 42% of countries had disruption of services for cancer prevention and treatment; the degree of disruption was proportional to the extent of the pandemic in that country.[19] Overall, two-thirds of the surveyed countries had included maintenance of health-care services for non-communicable diseases in their COVID-19 pre-paredness plans; however, substantial disparities were identified between high-income countries and low-income and middle-income countries (72% *vs* 42%). This lack of preparedness could have a detrimental long-term impact on the outcomes of patients with cancer, especially in resource-poor countries.

Of the treatment modalities assessed in our study, the smallest reduction in the number of patients was observed for radiotherapy. The reasons for this observation are likely to be multifactorial and include the lower risk of COVID-19 and severity of complications associated with radiotherapy (compared with surgery and chemotherapy). Additionally, patients who started radiotherapy in March, 2020, would have completed their radiation schedules since interruption of radiation is associated with poor oncological outcomes, as shown by the 23% reduction observed between March and May, 2020, which increased to a 45% reduction when assessing only April and May, 2020. Additionally, most major radiotherapy centres in India have long waiting lists that include substantially more patients than can be treated, resulting in fewer slots for radiation being unused. Centres in tier 1 cities, which have proportionally higher number of patients on waiting lists relative to available slots for treatment, had smaller reductions in the number of patients treated with radiotherapy than did tier 3 cities. The likelihood of radiotherapy being preferred by clinicians to other forms of cancer treatment is supported by the fact that in the UK, radiotherapy services decreased by only 10% during the 10-week lockdown from March to May, 2020, compared with a 40% reduction in surgery.[20] Similarly, data from both Italy and Latin America suggest that delivery of radiotherapy services were less affected than other modalities.[3,5]

In our study, some centres in tier 3 cities reported smaller decreases in patient numbers and in some cases, an increase in workload in some aspects of cancer management when compared with tier 1 and 2 cities. We hypothesise that this might be due to more patients accessing cancer care closer to their homes rather than travelling long distances to tertiary centres because of travel restrictions and the fear of increased risk of contracting COVID-19. Patients seeking care at centres within closer proximity to their homes could be considered one of the positive outcomes of the pandemic. Another positive effect of the pandemic has been that most centres in our study had initiated teleconsultations and video consultations as a substitute for face-to-face visits. Virtual appointments eliminate the risk of patients with cancer contracting COVID-19 during their hospital visit, while also reducing crowding within cancer centres, and prioritising treatment for individuals who would benefit the most. A Dutch study showed that 18·1% of patients on treatment and 8·6% of patients being followed-up had their hospital visits replaced by teleconsultations or video consultations during the pandemic.[21] Although most patients who were surveyed would have preferred a face-to-face visit at the hospital, approximately 40% of patients considered teleconsultation or video consultation an acceptable option. Considering that patients with cancer might worry more about their future health and the risk of SARS CoV-2 infection than the general population, this might be an acceptable trade-off.

The cessation of screening activities and diagnostic services is a major cause for concern. WHO data show that screening services paused in more than 50% of countries during the COVID-19 crisis.[19] In the UK, the combined effect of cessation of the national cancer screening programmes, decreased visits to general practitioners, reduced referrals to hospitals, and decreases in the number of elective endoscopies done is expected to lead to underdiagnosis of cancer.[20] Oral, cervical, and breast cancers are among the most common cancers in India, accounting for more than a third of all cancers, with the majority of patients presenting at an advanced

stage due to delayed diagnosis.[9,22,23] In 2016, the Indian Government launched a large screening programme for non-communicable diseases, the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular disease and Stroke, which includes screening for breast, cervical, and oral cancer.[22] However, this national cancer screening programme has been halted since mid-May, 2020,[22] since the screening methods used involve clinical (physical) examination. Interruptions in screening combined with the reduction in the number of minor procedures (largely diagnostic) is likely to lead to delayed diagnosis and advanced stage at presentation.

The mortality to incidence ratio for cancer in India is 0·64, which is substantially higher than that in high-income countries.[9] The high mortality from cancer is in part attributable to late diagnosis and the inability to access or complete treatment.[12] The proportion of patients receiving surgery, radiotherapy, or chemotherapy is half that recommended by international standards.[23] The scarcity of resources is further exacerbated by regional inequities in the distribution of cancer care facilities—eg, 40–60% of cancer centres and oncologists are located in the eight largest cities in India[12,23] and less than 2% of the population have access to pain relief and palliative care.[24] Thus, patients living outside of urban areas must make long, difficult, and often unaffordable journeys to access essential cancer care.[13] Restrictions on travel could intensify the difficulties regarding access to these resources.

The pandemic has had considerable impact on cancer research globally. Organisations such as the US Food and Drug Administration and the European Medicines Association issued guidelines for cancer research during the pandemic.[25,26] The key measures suggested were to reduce the use of immunosuppressive treatments and minimise hospital visits solely for research purposes. As a result, several cancer centres stopped accrual on ongoing trials, delayed the initiation of new projects, and amended protocols to minimise participant risk. Such changes are likely to delay the results of these projects. In the long term, the economic recession and diversion of funding to COVID-19 research will impact research funding for other diseases, including cancer. Cancer Research UK and the Canadian Cancer Society have had to decrease their budgets for research funding,[27] and a joint Indo-UK research grant initiative[28] has been withdrawn as a consequence.

The COVID-19 pandemic has also had some positive consequences. First, the response and outcomes of various countries to the pandemic have forced societies and governments to realise the importance of a strong public health-care system. Second, oncologists have had to prioritise treatments based on value and outcomes, both from a monetary and a patient-benefit viewpoint; this emphasizes the importance of value-based care, including initiatives such as Choosing Wisely.[29,30] Third, the pandemic has prompted patients to access cancer care closer to home, which encourages a distributed model of care; this implies that patients with relatively simple and common cancers will be treated close to their homes, while tertiary centres will provide more complicated and intensive treatments. Fourth, health-care systems and patients have readily adopted teleconsultations and video consultations, which could make routine follow-up at cancer centres more efficient. Fifth, COVID-19 research has demonstrated that large scale practice-defining trials can both be pragmatic and reliable; lessons learnt from the modification of cancer trial protocols have identified more efficient and practical ways of doing clinical research, which include avoiding unnecessary hospital visits by doing follow-up evaluations closer to patients' homes and less frequent imaging.[31,32]

The strengths of our study are that 41 major cancer centres in India were included, from all geographical areas of the country, representing public, charitable, and private hospitals, oncology-specific centres and multispecialty hospitals, located in tier 1, 2, and 3 cities. The inclusion of a wide variety of centres increases the generalisability of our results to the entire country. The patient numbers for cancer services (outpatient visits, inpatient admissions, diagnostic tests, and treatments) are raw data, rather than estimates. To our knowledge, this is the largest study to date globally to assess the impact of the COVID-19 pandemic on the provision of cancer care. Our study had some limitations: the data on reductions in screening, research, and education were estimates provided by the centres and not raw data; the comparisons did not adjust for natural and inherent increases in hospital patient numbers over time, and the introduction of new services or increased capacity. However, these data were difficult to collect reliably, and would have only had minimal influence on the margins of reduction since we compared timepoints that were only 12 months apart.

Our study demonstrates that cancer care was widely affected by the COVID-19 pandemic. All aspects of care, including screening, diagnosis, treatment, palliative care, and follow-up were reduced during the pandemic. It is likely that these reductions will result in delayed diagnosis, and suboptimal treatment for at least a proportion of patients who would have been diagnosed with cancer in this period. The downstream effects of these delays are likely to be observed in the next few months when an increased number of patients might present with more advanced disease and health-care systems could become overloaded due to the backlog of patients. The cancer care system needs to be prepared for this patient backlog and urgent measures to increase the diagnostic capacity and increase the efficiency of care pathways are necessary. Considering the current second wave of the COVID-19 pandemic in India, and the possibility of future outbreaks, our study emphasises the need to continue treatment of non-communicable diseases, such as cancer, during the pandemic. Public

messaging should reiterate the importance of accessing cancer treatment in comparison to the hypothetical risk of acquiring COVID-19. Physicians treating patients with cancer should also follow evidence-based treatment guidelines to optimise cancer management while simultaneously balancing the risks of SARS-CoV-2 infection. Globally, health-care systems need to be strengthened to ensure that the treatment of diseases, such as cancer, is not disrupted during future pandemics.

Contributors

PR, MS, GC, RAB, and CSP conceptualised and designed the study and did the literature search. All authors collected data, interpreted data, and wrote and revised the manuscript. All authors had full access to the full data in the study and accept responsibility to submit for publication. PR, MS, GC, RAB, CSP had access to the raw data and verified it.

Declaration of interests

AC reports personal fees from AstraZeneca, Novartis, Merck, Eli Lilly, Pfizer, Dr Reddy's, and Intas, outside the submitted work. All other authors declare no competing interests.

Data sharing

All the summated data collected are available in this Article and the appendix. The raw data from the individual centres are available from the study team, and will be shared on request to ncg@tmc.gov.in after the proposal is reviewed by a committee constituted by the National Cancer Grid.

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