ORIGINAL ARTICLE

Cancer Care Trend during two years of COVID-19 Pandemic at a Tertiary Care Super-Specialty Hospital: An Observational Study

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ABSTRACT

Summary and Background: COVID-19 pandemic affected all facets of life,1,2 including non-COVID health care delivery.3,4 While many elective healthcare aspects got deferred, five studies revealed that even emergent6,7 and essential health care delivery, including cancer care, was affected in most parts of the world, irrespective of the developmental status of countries.8 While cancer continues to be on the rise across the globe; efforts have led to many gains in cancer management in terms of screening, early diagnosis, different modalities, or multi- modalities with improved outcomes.9 However, COVID-19 has adversely affected cancer care-seeking, utilization, and delivery in almost all parts of the globe.3 While many studies have objectively demonstrated the decline in cancer care around the start10 or first year of pandemic,11 we wanted to follow the trend over approximately two years of the start of COVID-19 pandemic. Whether there has been a significant decline in cancer care in our hospital, if so, has there been any trend of a return to normal or an overshoot of the pre-pandemic numbers. The primary objective of our study was to understand the trend in cancer care at our hospital during the twenty-two months of the ongoing COVID-19 pandemic. We aim to provide feedback for policy matters on maintaining the continuity of cancer care in case more waves of COVID-19 occur or any other pandemic strikes in the future.

The methodology consisted of reviewing the records maintained in the Medical Records Department for 2019 (comparison year), 2020, and 2021(pandemic years). Missing information was obtained from core cancer management departments like medical oncology, radiation oncology, and surgical oncology. Data was collected for registrations, outpatient visits, admissions, day-care sessions, radiation therapy, including pain and palliation, and surgeries. Data were analysed on excel using descriptive statistics like counts, percentages, and arithmetic means.

Results revealed a drop in patients availing registration services, outpatient visits, admissions, day-care sessions, and surgeries. The highest decline was during the strict lockdown periods and pandemic waves. However, there was a trend of returning to regular pre-pandemic figures in most of the remaining months for all but radiation oncology services.

Conclusion: After the initial decline in the first year of the COVID-19 pandemic in the first year, there has been a catch-up of cancer care-seeking and delivery in the year 2021 of the COVID-19 pandemic era.

Limitation: The study did not find the impact of delays in diagnosis and treatment on individual patients and subsequent consequences on their short-term or long-term survival. The study is unicentric.

Keywords: Cancer care, COVID-19, Impact, Day-care, trend, radiation therapy, admissions, outpatient visits

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INTRODUCTION

COVID-19 pandemic affected all facets of life,[1,2] including non-COVID health care delivery.[3,4] In the first year of the COVID-19 pandemic, when the lockdowns were strict and extensive, fear of contagion was extreme among both patients and healthcare professionals,[12,13] and the decline in cancer care was resultant. While many elective healthcare aspects got deferred[5], studies revealed that even emergency[6,7] and essential health care delivery, including cancer care, was affected in most parts of the world, irrespective of the developmental status of countries.[8] Consequently, serious outcomes in cancer care like tumour stage migration and decreased survival have been revealed.[14] The impact has been universal and irrespective of demographics.[15,16] In India, some extensive studies have also been conducted that have revealed a similar pattern.[17]

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While the studies uniformly confirm a decline in almost all aspects of cancer care, there was some compensation by improvisation,[18] including the use of information technology such as video consultations and Tele -triaging through telemedicine.[19,20] Throughout the world, initial guidelines prioritized resources for COVID-19 but later on, maintenance of continuity in essential non -COVID-19 healthcare delivery was also emphasized.[21] Gradually, primary healthcare services started recuperating, but the trend of recuperation is less researched yet. As most of the research on Cancer care delivery also pertains to the early pandemic period, we felt the need to study the trend during twenty-two months of COVID-19. We hypothesized that there would have been a compensatory rush of patients to avail of all sorts of cancer services with the easing of lockdowns and revised guidelines for continuity of essential healthcare.

METHODOLOGY

The study was carried out in Sher-I-Kashmir Institute of Medical Sciences, over 1000 bedded super-speciality, tertiary care hospital in North India, with medical oncology, radiation oncology, surgical oncology, and clinical haematology. A small percentage of cancer patients in nuclear medicine, colorectal, and neurosurgery are also registered in the cancer registry. Records obtained from Medical Records Department were reviewed month-wise for the COVID-19 period of 2020 and 2021 and compared with the pre-pandemic period of 2019. Cancer services included in the study were (i) new patient registrations, (ii)outpatient attendances, (iii) day-care sessions, (iv) radiation therapies, (v) pain and palliation therapy, (vi) full stay admissions, and (vii) onco-surgeries. Diagnostic cancer services were excluded because of the non-availability of a separate record. An issue while making the month-wise comparison was the drop in the number of patients who availed of hospital services in general and cancer services in particular immediately after the abrogation of article 370 in the year 2019 in Jammu and Kashmir due to a clampdown. Most affected due to the clampdown were August and September 2019. For this variation, an average of immediately preceding months of June and July was calculated, and the figure obtained was applied to these clampdown months. (There is no seasonal variation from June to September in the union territory, validated by checking previous years' data).

Statistical Analysis: Descriptive statistics were used, and data were analysed as counts, percentages, and arithmetic mean.

RESULTS

Registration: Table 1 summarizes total annual and mean monthly new cancer patient registrations, which fell from absolute numbers of 4563 in the year 2019 to 3827 in 2020 and rose to 4630 in 2021, a decline of 16.13% from 2019 to 2020 and an increase of 1.47% from 2019 to 2021. Radiation oncology had the highest drop in annual registrations in 2020 and 2021 (31.57% and 34.96 % than the pre-pandemic year of 2019, in contrast to medical oncology, surgical oncology, and clinical haematology. Surgical oncology registrations increased in both pandemic years. Table 2 reveals that registrations dipped in April-May 2020 during the strict lockdown periods with a 48.05% reduction compared to April-May 2019. During the second wave of COVID-19 in May 2021, a 53.91% reduction occurred compared to May 2019. Figure 1 reveals the monthly trend for registration in all three years.

Outpatient visits: Table 1 summarizes the three central oncology departments' annual and monthly mean outpatient visits. Overall, outpatient visits dropped by 20.48 per cent from 2019 to 2020 and 21.97percent in 2021. Outpatient visits fell across all three departments as compared to the year 2019. The highest drop was in radiation oncology in both pandemic years. Figures2 shows the monthly trends of all three departments for three years, showing two noticeable dips. During the April -May lockdown of 2020, outpatient visits dropped by 49.66% and 88.76% in May 2021, when the second wave occurred (table2).

Admission: As seen in table 1, overall admissions dipped in both 2020 and 2021 as compared to 2019 with an absolute figure of 6601,4760 and 5644 respectively (- 27.89% -14.5 %respectively). However, Surgical oncology admissions rose by 17.65 per cent in 2021 compared to 2019. Medical oncology admission overshot the pre-pandemic level albeit slightly. Admissions remained low in radiation oncology compared to 2019 except for June 2021. Figure 3 reveals the monthly trend of admissions for all three oncology departments. Overall, admissions dropped by 35.49 per cent and 40.53 per cent during the lockdown of 2020 and the second pandemic wave of 2021, as shown in table 2.

Day-care sessions: Day-care sessions for chemotherapy in

Table 1: showing impact of COVID-19 on Cancer Care

Impact of COVID-19 on Registration of New Cancer patients								
Specialty/ yr	2019 (pt Number)	Monthly mean	2020 (Pt Number)	Monthly mean	2019-2020 Percent change	Yr 2021 (Pt Number)	Monthly mean	2190-2021 Percent change
Med Onco	2402	200.17	2090	174.17	-12.99	2672	222.67	18.75
Rad onco	1208	100.67	787	65.58	-31.57	748	62.33	-34.96
Surg Onco	562	46.83	593	49.42	5.52	761	63.42	35.41
Cl Haem	274	22.83	240	20	-12.4	331	29.58	20.8
Nuc Med	117	9.75	117	9.75	0	118	9.83	0.85
Total	4563	380.25	3827	318.91	-16.13	4630	385.83	1.47
Impact of COVID-19 on outpatient visits to Cancer Clinics								
Medical Oncology	22640	1886.67	19659	1638.25	-13.17	20734	1727.83	-8.42
Raiation oncology	17592	1466	12481	1040.08	-31.1	10621	885.08	-39.6
Surgical Oncology	4999	416.58	3828	320.92	-23.42	4568	380.67	-8.62
Total	45231	3769.25	35968	2997.33	-20.48	35923	2993.58	-21.97
Impact of COVID-19 on Hospital Admissions in Oncology Departments								
Medical Oncology	1606	133.83	1108	92.33	-31	1635	136.25	1.8
Raiation oncology	4253	354.41	3025	252.08	-28.87	3136	261.33	-26.26
Surgical Oncology	742	61.83	627	52.25	-15.5	873	72.75	17.65
Total	6601	550.08	4760	396.66	-27.89	5644	470.33	-14.5
Impact of COVID-19 on Day-care Sessions								
Medical Oncology	14118	1176.5	12169	1014.08	-13.8	15702	1308.5	11.22
Raiation oncology	3285	273.75	2562	213.5	-22	2301	191.75	-29.95
Total	17403	1450.25	14731	1227.58	-15.35	18003	1500.25	4.07
Impact of COVID-19 on Surgeries performed by Surgical Oncology								
No. of Surgeries	318	26.5	363	30.25	+14.15%	421	35.08	+32.39%
Impact of COVID-19 on Radiation Therapy								
Pts received External Beam Radiation	2477	206.41	1588	132.3	-35.9%	2034	169.5	-17.9%
Patients received brachytherapy	55	4.5	48	4.0	-12.73	10	.83	-81.9% (Delayed Radiation Source)

Table 2: Showing Impact of Lockdown/ Pandemic Wave on Cancer Care

Impact of lockdowns and pandemic waves on new Cancer patient registrations					
Impact of Lockdown / pandemic wave	Apr May 2019 (Number)	Apr May2020(number)	Percent drop	Apr May2021 (number)	Percent drop
Impact of lockdown in Apr-May 2020	849	441	-48.05	601	29.21
	May 2019	May 2020	Percent drop	May 2021	Percent drop
Impact of second pandemic wave May 2021	434	230	47	200	-53.91
Impact of Lockdowns and Pandemic Waves on Outpatient Visits to Cancer clinics					
Impact of Lockdown / pandemic wave	Apr May 2019 (Number)	Apr May2020(number)	Percent drop	Apr May2021(number)	Percent drop
Effect of lockdown in Apr-May 2020	7873	3963	-49.66	3917	-50.25
	May 2019	May 2020	Percent drop	May 2021	Percent drop
Impact of second pandemic wave May 2021	3825	2187	-42.82	430	-88.9
Impact of Lockdowns and Pandemic Waves on Admissions to Oncology Departments					
Impact of Lockdown / pandemic wave	Apr May 2019 (Number)	Apr May2020(number)	Percent drop	Apr May2021(number)	Percent drop

Impact of lockdown in Apr-May 2020	1144	738	-35.49	736	-35.66
	May 2019	May 2020	Percent drop	May 2021	Percent drop
Impact of second pandemic wave May 2021	565	357	-36.81	336	-40.53
Impact of Lockdowns and Pandemic Waves on Day-care Sessions					
Impact of Lockdown / pandemic wave	Apr May 2019 (Number)	Apr May2020(number)	Percent drop	Apr May2021(number)	Percent drop
Impact of lockdown in Apr-May 2020	3040	2160	-28.95	3053	0.43
	May 2019	May 2020	Percent drop	May 2021	Percent drop
Impact of second pandemic wave May 2021	1538	1090	-29.13	1473	-4.23
Impact Of Lockdowns and Pandemic Waves on Surgeries by Onco-surgery Department					
Effect of Lockdown / Pandemic wave	Apr May 2019 (Number)	Apr May2020(number)	Percent drop	Apr May2021(number)	Percent drop
Effect of lockdown in Apr-May 2020	56	42	-25%	59	+5.36%
	May 2019	May 2020	Percent drop	May 2021	Percent drop
Effect of second pandemic wave May 2021	24	27	+12.5%	23	-4.17%

Table 3: Number of Patients managed in Pain and Palliation of Radiation Oncology

Service	Yr 2019	Yr 2020	Percent change 2019-20	Yr 2021	Percent change 2019-21
OPD	2363	2563	8.5%	2263	-4.2%
Day-care	2196	1132	-48.45%	1454	-33.79%

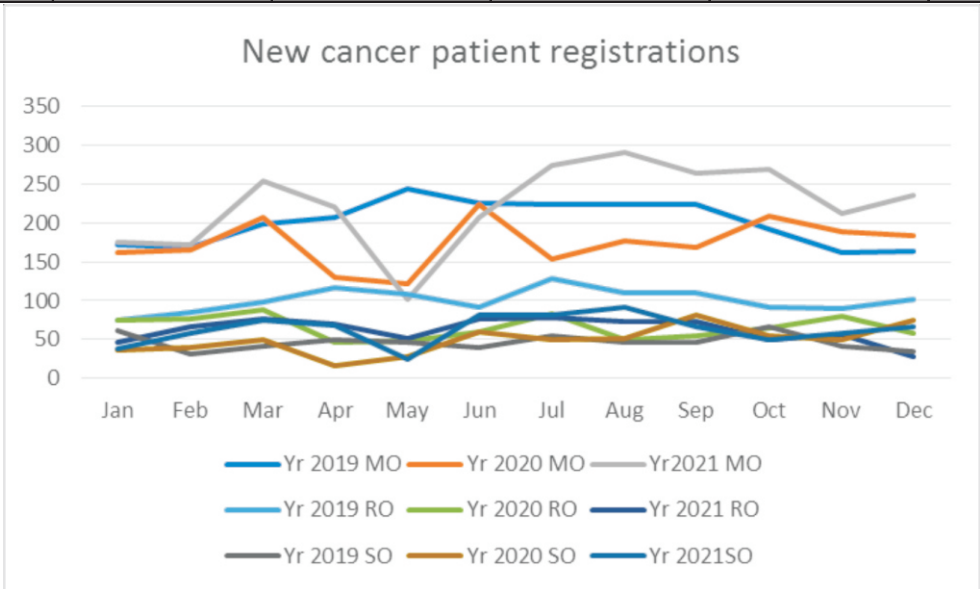


Figure 1: showing a trend of new cancer patient registrations for 2019, 2020 and 2021
MO-Medical Oncology, RO-Radiation Oncology, SO-Surgical oncology, CH-Clinical Haematology, NM-Nuclear Medicine

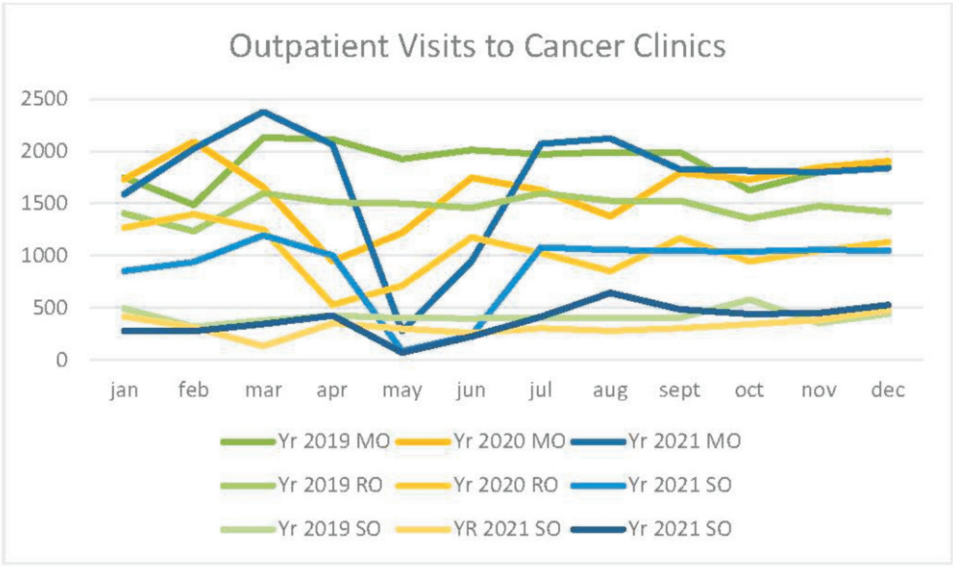


Figure 2: showing trend of number of outpatient visits to Cancer clinics in 2019, 2020 and 2021

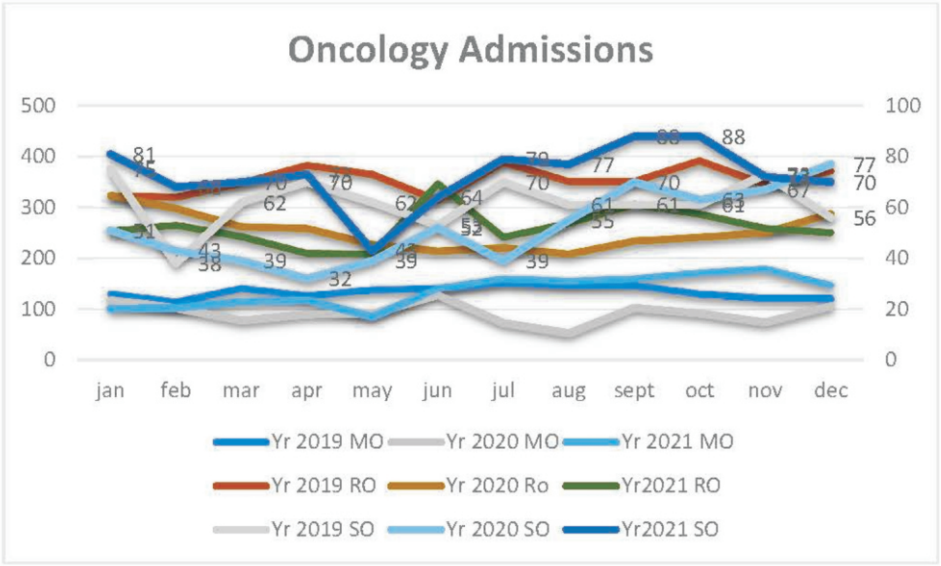


Figure 3: showing trend of number of Cancer admissions in Oncology departments for 2019, 2020 and 2021

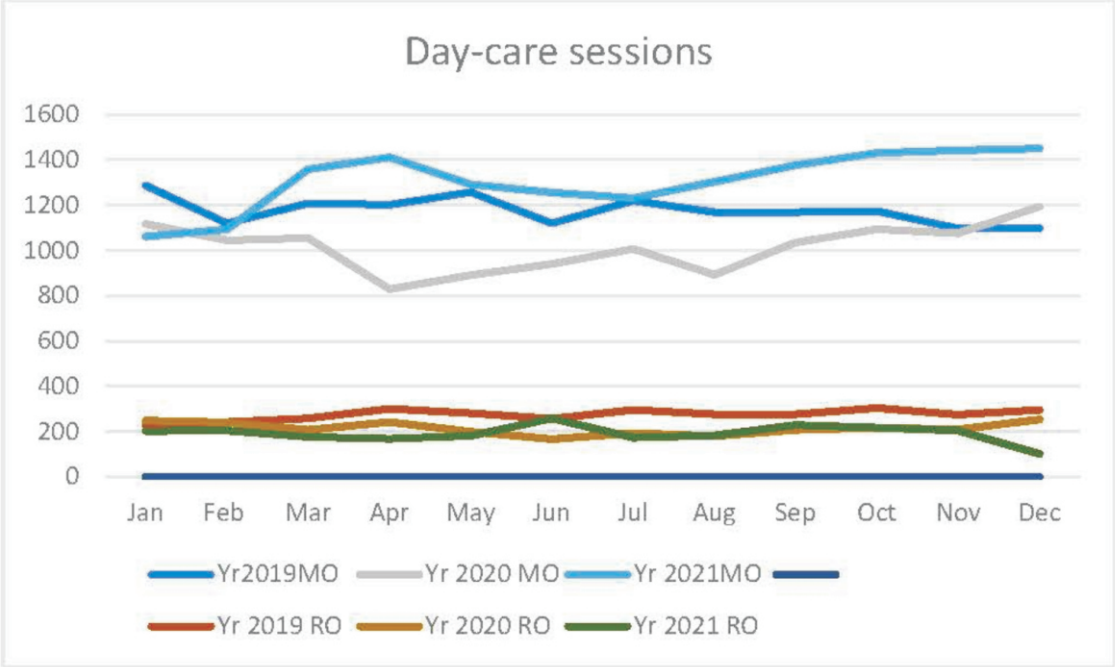


Figure 4: showing trend for number of day-care sessions in 2019, 2020 and 2021

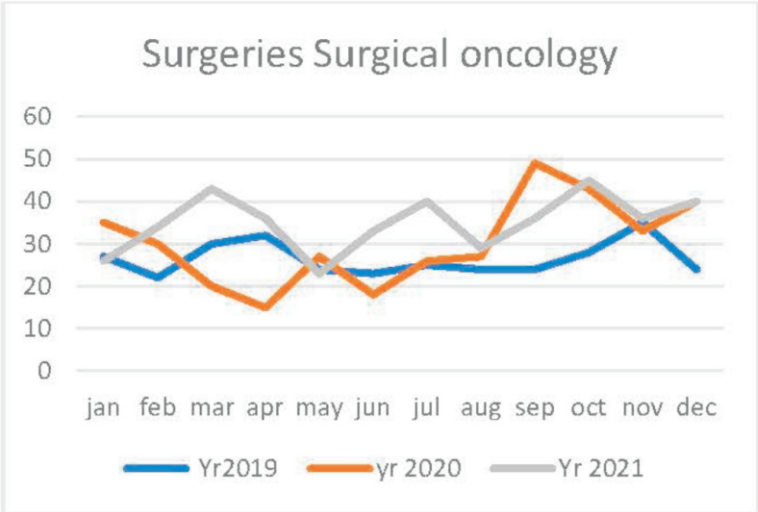


Figure 5: showing No. Of Cancer Surgeries by Surgical Oncology

medical oncology dropped in 2020 by 13.8 per cent but increased in 2021 by 11.22 per cent, however for radiation oncology, these decreased in both 2020 and 2021 by 22.0 per cent and 29.95 per cent, respectively (Table 1). Cumulatively, the lockdown of April-May 2020 had the effect of decreasing the day-care sessions by 28.95%. The second pandemic wave of May 2021 decreased day-care sessions by 29.13% (table 2). The trend of day-care sessions during the pre-pandemic and pandemic years is revealed in figure 4.

Radiation Therapies: Table 2 reveals that the number of patients who received External Beam Radiation Therapy dropped by 35.9% from 2019 to 2020 and 17.9% from 2019-2021. The number of patients who received brachytherapy dropped by12.73% from 2019- to 2020 and 81.9% in 2021. (This disproportionate annual drop was due to the delay of almost six months in receipt of the radioactive source, which was an indirect effect of COVID-19).

Palliative Care: As shown in table 3, the number of outpatient visits in pain and palliation increased by 8.5% from 2019 to 2020 but dropped slightly by 4.2% in 2021. However, day-care palliation sessions dropped by 48.45% and 33.79% in 2020 and 2021, respectively.

Surgeries: Onco-surgeries by the surgical oncology department increased in both 2020 and 2021 as compared to 2019 by 14.15 per cent and 32.39 per cent, respectively (table1). Compared to Apr-May of 2019, surgeries dropped by 25% during the lockdown period of April-May 2020 but did not drop during the second wave of May 2021 (table 2). Figure 5 shows a monthly trend of cancer surgeries over the three years.

DISCUSSION

Our study focussed on the trend of certain cancer care services like new patient registrations, outpatient visits, hospital admissions, day-care sessions, onco-surgeries, radiation therapies, and pain &palliation over twenty-two months of COVID-19 pandemic, beginning from ending March 2020 to December 2021, in comparison to 2019. Cumulatively, we found declining patient numbers for all cancer services from 2019 towards 2020, while a return towards pre-pandemic levels and even an overshot was seen in most services in the year 2021. Registrations across all departments except surgical oncology decreased in 2020 but increased in 2021 except for radiation oncology. This reflects that fewer new patients were being diagnosed/ referred to the cancer centre in 2020. Reduction in all department registrations was maximum during the lockdown of 2020 and higher still during the second wave in 2021. Radiation oncology had a considerable decline in patient numbers in all functions, including registration, outpatient visits (except pain and palliation outpatient visits), admissions, day-care sessions, and radiation therapy in both pandemic years of 2020 and 2021. Day-care sessions in radiation oncology's Pain and palliation section also saw a considerable decline, although outpatient attendance increased in 2020.

Outpatient numbers declined by 20%-22% across all oncology departments in both pandemic years. Still, the decline was maximum in the early lockdown period of April-May 2020 and the second pandemic wave of 2021 (49.7% and 89%, respectively). The hospital closed regular OPDs from May 15 to June 15 2021, and only after triaging by teleconsultation patients were called for physical interaction in the respective OPDs. This was in line with the guidelines laid by the Ministry of Health and Family Welfare, India.20 CDC has also stressed the use of telemedicine in its guideline for low-resource settings.[21] With the changing trend globally,[19] many hospitals in India adopted telemedicine as an alternative to physical interaction during peak pandemics.[18] Abdul Rahman Jazieh et al., in a cross-continental study from April 21 to May 8 conducted in 356 cancer centres, also found that many cancer centres had switched to the virtual clinic and even virtual tumour board meetings.[22]

Hospital admissions declined for all the three specialities of medical, surgical, and radiation oncology in 2020 but returned to and even overshot the pre-pandemic levels except for radiation oncology in 2021. While day-care sessions dipped by 28% during the lockdown period of 2020, it overshot the pre-pandemic level in 2021 for medical oncology by 11%. Onco-surgeries by surgical oncology showed an increase as compared to the pre-pandemic period (except a dip of 25% in the lockdown period of April-May), which was due to non-curtailment of cancer surgeries (all other elective surgeries were deferred for some months of 2020 and the second wave of the pandemic for conservation of resources like oxygen, etc. towards COVID-19 care). Also, cancer surgeries postponed in other hospitals were

performed in our hospital. According to Prof Eva JA Morris et al., in April 2020, there was a 63% reduction in referral for suspected colorectal cancer, which returned to pre-pandemic levels by October 2020. He also found a decrease of 31% in April 2020, which had returned to 2019 levels by October 2020.[11] Referenced literature primarily consists of research about the early pandemic periods, compared to the pre-pandemic period. All the cancer management pathways showed steep declines during that period. Our study also shows steep declines in almost all services during lockdown and second pandemic waves. However, with the easing of lockdowns, patient flows to the hospital to avail various cancer services and treatment modalities improved.[26] Second round of the national pulse survey conducted by WHO for the last quarter of 2020 revealed 32% of countries reporting disruption to cancer treatment services.[24] In a large multicentric cancer centre study in India, Priya Ranganathan et al. found that between March 1 and May 31, 2020, there was respectively a 54%, 46%, 36%, 37%, 49%, and 52% reduction in new registrations, follow up visits, hospital admissions, outpatient chemotherapy, major and minor surgeries.[17] Guven Dc et al. in their study also found a lesser number of new patient applications during the early pandemic days, a significant decrease in admissions for palliative care (p=.028) and elective interventional procedure(p=.001) but an increase in the frequency of hospitalizations for chemotherapy.[10] Our study also revealed maximum reductions in the same period of the COVID-19 pandemic, but radiation oncology's pain and palliation section showed an increase in outpatient visits. In another multicentric research by Jyostna Sharma et al. on the impact of COVID-19 on childhood cancers, the weekly average registration revealed a decline of 47.9%in the lockdown period.[15] Harvey W et al., in a large study, reported that weekly new identified cases for six cancers (breast, colorectal, lung, pancreatic, gastric, and oesophageal) in the US fell by 24.7% for pancreatic cancer and to 51.8% for breast cancer.[23] According to Alvina. G.Lai et al. Weekly data from England and Northern Ireland until April 2020 demonstrate significant falls in admissions for chemotherapy (45-66% reduction) and urgent referrals for early cancer diagnosis (70-89%).25 Debra Patt et al. found a substantial decrease from March to July 2020 compared to the similar period in 2019 for cancer screening, outpatient-based evaluation and management, and therapies. They also found a reduction in mastectomies, colectomies, and prostatectomies among American seniors using large medical claims database.[16]

Since our hospital was a referral centre for severe and critical COVID-19 patients, resources, including beds, were prioritized for COVID-19 patients as per various guidelines and government orders. However, the number of cancer beds was never compromised, and on the contrary, it was increased after the up-gradation of our cancer centre to the State Cancer Institute in 2021. The effects of delay in diagnosis and registration are yet to be seen in terms of the survival of the patients. Abdul Rahman Jazieh et al., in a cross-continental study from April 21 to May 8 conducted in 356 cancer centres, found that more than a third of centres reported patient exposure to harm from interruption of cancer-specific care or other medical care, the impact being more in low-income countries.[20] In yet another study, Guven et al. found a significant increase in the number of patients with inoperable or metastatic disease on their initial visit. They also saw a decline in cancer screening and a considerable increase in 90-day mortality compared to the pre-pandemic period.[14] Enrico Baldi et al. found a rise of 58% in out-of-hospital cardiac arrests (OHCA) during the early pandemic period in some provinces of Italy due to patients not activating the EMS systems.[12]

Since our study included almost two years of the pandemic, the cancer care utilization pattern during this long period showed a return to normal trend in many aspects. KFF, a US-based non-profit organization, studied the trends in overall and non-COVID-19 hospital admissions in the US using the EMR. They found that total hospital admissions dropped to the lowest of 69.2% of the predicted value on April 4 and after that started rising. By November 2020, these were around 93-95% of predicted numbers.[26] As analyzed by Mike Richards et al., reasons for the decline in cancer care have been myriad during the COVID-19 pandemic, but the care needs reorganization to mitigate the impact.[27]

CONCLUSIONS

The study has demonstrated that after an initial decline of cancer services which was more profound during the lockdown period and second pandemic wave, there was a

trend of return to normal and even beyond in most aspects. Awareness among the people is required for timely healthcare-seeking behaviours despite any future outbreaks and prioritization of essential non-COVID-19 care by the Governments while dealing with the pandemic. Observation of the trend pattern over a more extended period has been a strength of this study. The limitation of the study is in its unicentric nature. Short- and long-term repercussions of the delays and deferrals in cancer management in terms of morbidity, mortality, and survival are on the future research list.

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Written Informed Consent: Taken

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