

Impact of COVID-19 Pandemic on the Utilisation of Medical Oncology Services at a Tertiary Care Hospital in Srinagar, India: A Retrospective Study

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ABSTRACT

Introduction: Coronavirus Disease-19 (COVID-19) Pandemic affected healthcare delivery worldwide from all quarters be it routine or essential care, including cancer care. All aspects like screening, diagnosis, and treatment were affected regardless of the developmental status of countries.

Aim: To find out the extent and magnitude of cancer care affected during pandemic by comparing the data during pandemic for outpatient visits, new registrations, admissions, and day-care chemotherapy sessions with pre-pandemic data.

Materials and Methods: This retrospective study was conducted in the Department of Medical Oncology of State Cancer Institute in Srinagar, India. The parameters assessed were the number of outpatient visits, new registrations, admissions, and day care chemotherapy sessions from the department of Medical Oncology. Anonymised cumulative data of all the patients who availed these services was included. Data were collected for eight months, during pandemic in 2020 and were compared with

the data from previous year 2019. The effect of lockdown was assessed by comparing these parameters with the non lockdown period. Statistical analysis was done by independent t-test.

Results: The number of outpatient visits dropped from 15425 from non lockdown period to 12670 in lockdown period (p -value=0.019), number of new admissions from 1613 to 1418 (p -value=0.001), and chemotherapy sessions from 9374 to 8081, (p -value=0.004). The number of patient registrations also declined but the drop was not significant (p -value=0.171). All the parameters except in-patient admission improved during the non lockdown period with the highest improvement in registration, but inpatient admission revealed a similar reduction as in the lockdown period.

Conclusion: The COVID-19 pandemic and the subsequent lockdown had a significant impact on the number of outpatient visits, new admissions, and chemotherapy sessions. This suggests that the treatment protocols and chemotherapeutic management of cancer care were badly affected by the pandemic.

Keywords: Cancer care, Coronavirus disease-2019, Lockdown, Teleconsultation

INTRODUCTION

The COVID-19 was declared a pandemic by World Health Organisation (WHO) on 11 March 2020 which eventually left an indelible impact on cancer care [1]. It has resulted in widespread mortality and morbidity and exposed the loopholes and frailties of the healthcare system worldwide [2]. Healthcare services in their entirety especially oncology were adversely affected during the first year of the pandemic [3]. Despite all the efforts utilisation of cancer care facilities ranging from screening, consultation, diagnosis, and treatment dropped the world over [4,5].

The first case of Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-CoV2) in India was reported on January 30th, 2020 [6]. Cross border travel restrictions were implemented in early March 2020 followed by a nationwide lockdown [6,7]. There have been a series of nationwide lockdown from March 24th, 2020-May 31st, 2020, and non lockdown periods from 1st June-31st July 2020 in India [8]. The effect of the pandemic on cancer care was multifactorial; lockdown and travel restrictions during the first peak of the pandemic have adversely affected access to quality healthcare, especially for individuals in rural areas who are entirely dependent on urban centers for cancer care [9]. In order to deal with the extra burden of COVID-19 patients the government issued guidelines for reallocation of doctors to perform COVID-19 duties. The reallocation of doctors and healthcare workers by the hospital administration for the COVID-19 duties included oncologists also, which eventually led to the dearth in the staff taking care of cancer

patients [10]. The disruption was further compounded by fear among people of contracting COVID-19 in hospitals and consequent avoidance of outpatient visits [11]. On the other hand, there was apprehension among doctors and related staff about contracting COVID-19 from patients [12]. Although, technology came to the rescue through telemedicine, the ubiquitous resource constraints of the developing world limit the usage of such technologies and cancer care parameters continued to reveal decline in-service utilisations [13].

The study was conducted in a state cancer center, which is a separate center under the administrative control of tertiary care hospitals providing non COVID-19 as well as COVID-19 care for severe and critical COVID-19 patients. Tertiary care hospital being the only major, 1015 bedded tertiary care, multispecialty hospital for medical oncology caters majority of the cancer patients, therefore there was an urgent need of analysing the effect of COVID-19 pandemic on cancer care. And this will act as a feedback for future comprehensive strategies on cancer care planning during pandemics. Therefore, present study was conducted to evaluate the extent of effect that COVID-19 posed on the utilisation of cancer care facilities including new patient registration, outpatient visits, inpatient admission, and day care chemotherapy sessions for the medical oncology department of a tertiary care hospital.

MATERIALS AND METHODS

The retrospective study was performed in the Department of Medical Oncology at a tertiary care hospital, Sher-I- Kashmir Institute

of Medical Sciences, Jammu and Kashmir, India. Institutional ethics committee approval (protocol No.143/2021) was obtained.

Inclusion criteria: All the cancer patients, irrespective of the gender and type of cancer, who presented in the oncology department within the study period was included.

Exclusion criteria: Data from August 2019 to September 2019 was excluded because of socio-political turbulence in the Union Territory of J&K during that period similarly data from August 2020 to September 2020 also was excluded. The period was a confounder due to restriction on public movement as a result of curfew and consequent decreased visit to hospitals, which could lead to misinterpretations. Data from January and February 2020 were excluded as in India lockdown period started from March and similarly data from January and February 2019 were also excluded to avoid bias in comparison.

Anonymised cumulative data of all the patients who availed the selected services (Out-patient Department (OPD) visits, new registration, admission and day care chemotherapy) from March to July 2020 and October to December 2020 and corresponding pre-pandemic period of 2019 for comparison were included. Total patients for outpatient visits was 28185, for New Registrations- 3031, for Admissions- 1802 and for day care chemotherapy sessions- 17455, within the study period, were enrolled [Table/Fig-1].

(2019 vs 2020)	Outpatient visits (year)		Registrations (year)		Admissions (year)		Day-care chemo doses (year)	
	2019	2020	2019	2020	2019	2020	2019	2020
Statistics								
Cumulative count for eight months Σ (March-July and October-December)	15425	12760	1613	1418	1070	732	9374	8081
Sample size	28185		3031		1802		17455	

[Table/Fig-1]: Sample size for the four parameters/services in pre-pandemic periods.

Study Procedure

Data was collected from the various modules of the Hospital Information System (HIS) in the Medical Records Department (MRD) about the number of cancer patients' registrations for medical oncology each month beginning March 2020 to July 2020 and October 2020 to December 2020 (8 months). The numbers were compared month-wise with the pre-pandemic year of 2019; March 2019 to July 2019 and October 2019 to December 2019.

A similar methodology was applied for studying the parameters of outpatient visits, admissions, and day care chemotherapy as well. The two sets of the data (2019 and 2020) compared were symmetric to prevent any seasonal variation in figures affecting the results, and the months in both sets were the same.

STATISTICAL ANALYSIS

Descriptive statistics like, percentage mean, standard error of mean and standard deviation, were calculated using Graphpad 8 (GraphPad Inc., San Diego, CA, USA). Independent t-tests were performed to statistically analyse the data with a p-value set at 0.05.

RESULTS

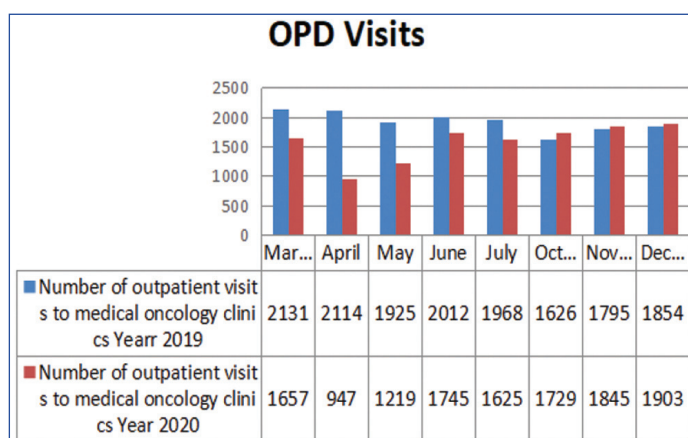
Outpatient (OPD) Visits

In COVID-19 pandemic period a total number of 12,670 OPD visits were recorded, whereas in pre-pandemic period 15,425 OPD visits were recorded for the same time period. Therefore, the number of outpatient visits dropped by 17.86% due to COVID-19 pandemic. The impact of COVID-19 on OPD visits was found to be significant. Maximum number of patient visits in pre-pandemic period was 2131, recorded in March 2019 and the lowest of 1626 in

October 2019. For the same period in 2020 during COVID-19, the maximum number of patient visits of 1903 was recorded in December and the minimum of 947 was observed in April [Table/Fig-2,3].

Parameter	2019 (Pre-pandemic period)		2020 (COVID-19 pandemic period)	
	Month	Number	Month	Number
Study period	08	15425	08	12670
Percent drop due to COVID-19	17.86%			
Maximum OPD visits	March	2131	December	1903
Minimum OPD visits	October	1626	April	947
\bar{x}	1928.13		1583	
SD	168.54		330.12	
SEM	59.59		116.71	
Independent t test, p-value	0.019			

[Table/Fig-2]: Outpatient Visits to medical oncology in 2019 and 2020. SD: Standard deviation; SEM: Standard error of mean



[Table/Fig-3]: Variation in the number of outpatient visits in pre-pandemic period.

New Registrations

In COVID-19 pandemic period a total number of 1418 new registrations were recorded, whereas in pre-pandemic period 1613 new registrations were recorded for the same time duration. Therefore, a drop of 12.09% was observed due to COVID-19 pandemic. The difference was found to be statistically non-significant. The maximum number of registrations i.e., 244 was seen in May pre-pandemic period, and the lowest of 161 in November. Whereas pandemic period 2020 maximum registrations of 223 were recorded in June and a minimum of 122 in May [Table/Fig-4,5].

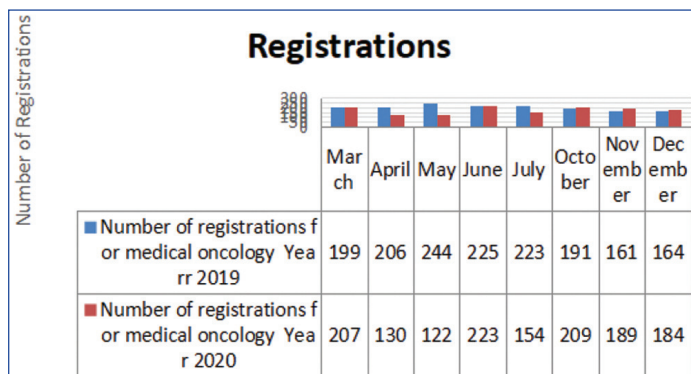
Parameter	2019 (Pre-pandemic period)		2020 (COVID-19 pandemic period)	
	Month	Number	Month	Number
Study period	08	1613	08	1418
Percent drop	12.09%			
Maximum registrations	May	244	June	223
Minimum registrations	November	161	May	122
\bar{x}	201.63		177.25	
SD	29.29		37.79	
SEM	10.35		13.36	
p-value	0.171			

[Table/Fig-4]: Registrations with medical oncology in 2019 and 2020.

Admissions

In COVID-19 pandemic period a total number of 732 new admissions were recorded, whereas in pre-pandemic period 1070 new admissions were recorded for the same time duration. Therefore, a drop of 31.59% was observed due to COVID-19 pandemic. The maximum number of admissions, i.e., 151 was recorded in

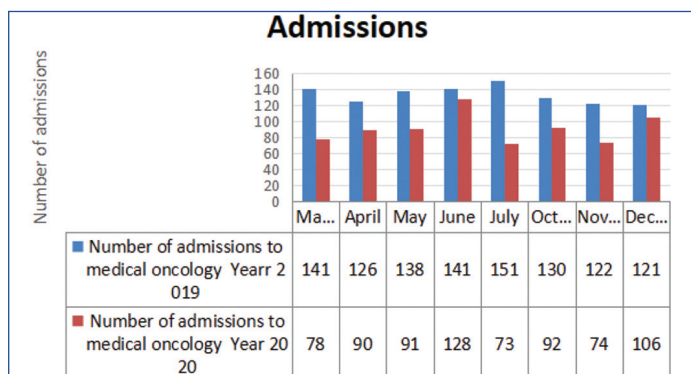
July pre-pandemic period and the minimum of 121 in December. Whereas in pandemic period, 2020 had maximum admissions of 128 in June and a minimum of 73 in July [Table/Fig-6,7].



[Table/Fig-5]: Variation in the number of registrations for pre-pandemic period.

Parameter	2019 (Pre-pandemic period)		2020 (COVID-19 pandemic period)	
	Month	Number	Month	Number
Study period	08	1070	08	732
Percent drop	31.59%			
Maximum admissions	July	151	June	128
Minimum admissions	December	121	July	73
\bar{x}	133.75		91.50	
SD	10.66		18.42	
SEM	3.77		6.51	
p-value	0.001			

[Table/Fig-6]: Admissions to Medical Oncology in 2019 and 2020.



[Table/Fig-7]: Variation in the number of admissions to pre-pandemic period.

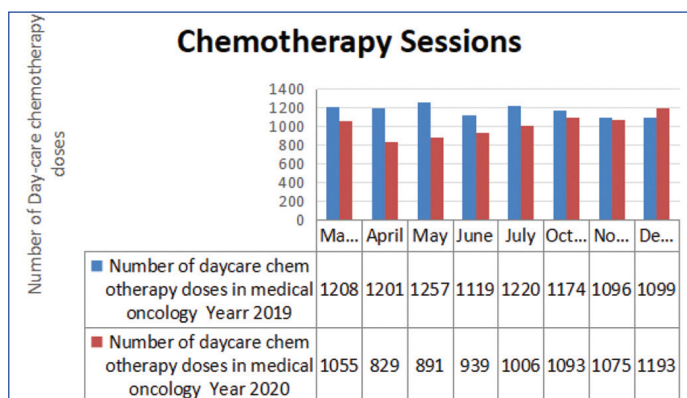
Chemotherapy Sessions

In COVID-19 pandemic period, a total number of 9374 chemotherapy sessions were recorded, whereas in pre-pandemic period 8081 chemotherapy sessions were recorded for the same time duration. Therefore, a drop of 13.79% was observed due to COVID-19 pandemic. The maximum number of visits for chemotherapy sessions pre-COVID-19, was recorded as 1257 in May, with the lowest of 1096 in November. While as COVID-19 pandemic period a maximum number of visits of 1193 for sessions in December, and a minimum number of visits of 829 was observed for April [Table/Fig-8,9].

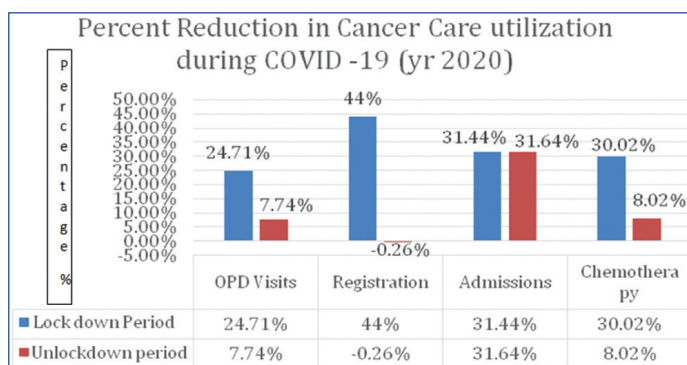
Out of eight months, March, April and May were lockdown months and June, July, October, November, December were unlock-down months. A drop of 44% was found in registrations during the lockdown period. The registrations returned to normal during the non lockdown period and the total period did not show any significant drop. Inpatient admissions to medical oncology did not increase during the non lockdown phases which were 31.44% and 31.64% during the lockdown and non lockdown phases, respectively [Table/Fig-10].

Parameter	2019 (Pre-pandemic period)		2020 (COVID-19 pandemic period)	
	Month	Number	Month	Number
Study period	08	9374	08	8081
Percent drop	13.79%			
Maximum chemo sessions	May	1257	December	1193
Minimum chemo sessions	November	1096	April	829
\bar{x}	1171.75		1010.13	
SD	60.45		118.69	
SEM	21.37		41.96	
p-value	0.004			

[Table/Fig-8]: Chemotherapy sessions in day-care of medical oncology.



[Table/Fig-9]: Variation in the number of chemotherapy doses in pre-pandemic period.



[Table/Fig-10]: The effect of lock-down and non lock-down during COVID-19 pandemic on medical oncology services.

DISCUSSION

In the current study, overall, all aspects of cancer care in medical oncology including outpatient visits, registrations, admissions, and chemotherapy sessions were affected during the months of COVID-19 pandemic (p-value of 0.0199, 0.1713, 0.0001, 0.0040, respectively). According to the Pulse Survey on Essential Health Services conducted by WHO in 104 countries in the year 2020, 55% reported a disruption in cancer care diagnosis and treatment out of which 5% reported a severe disruption [14].

Ranganathan P et al., in a cohort study across India revealed a substantial decline in the number of new registrations, follow-up visits, cancer surgeries, radiotherapy, and chemotherapy sessions during the peak of the lockdown in 2020 [15]. The findings of Rhainnon E et al., correlate with the present study who reported 42% of cancer patients and survivors experienced disruption in cancer care management and treatment [16]. Similarly, Peacock HM et al., in Belgium revealed a 44% reduction in the total diagnosis of invasive cancers in April 2020 compared with April 2019, coinciding with the first wave of the COVID-19 pandemic [17]. There was a reduction of 24.71% and 7.74% from 2019 during the lockdown and non lockdown periods in outpatient visits in the present

study. This may be attributed to the fact that strict lockdown with consequent inaccessibility to the hospital and unprecedented fear among people of contracting SARS-CoV-2 infections in hospitals eventually forced people to stay away. The hospital also shifted towards a telemedicine mode and only selected patients were called for physical interaction, in compliance with the national guideline which had already been implemented in some cancer centers and hospitals.

Impact on registration revealed the highest reduction of 44% in the lockdown of April-May 2020, however, the registrations during 2019 and 2020 did not show a significant difference ($p=0.1713$). In India, a study across various government and private hospitals, and cancer centers conducted by Sharma J et al., on paediatric cancer care revealed that weekly average patient registration was 67.3 pre-lockdown (from January 1- March 23, 2020) and 35.5 post-lockdown (from March 24-May 31, 2020, representing a decline of 47.3% corroborating with findings of our study. In the pre-lockdown period, the proportion of children who travelled >500 km was 20.7% which declined to 8.2% in the post-lockdown period ($p=0.001$) [9]. Maluchnik M et al. likewise reported decreased access to primary care where patients are given DILo cards for a quick pathway to cancer diagnosis and treatment [18]. In the present study, day-care chemotherapy sessions dropped to 30% during the Apr-May lockdown of 2020 but, only an 8.02% reduction was seen during the non lockdown period. During the lockdown period, most palliative protocols were either deferred or modified by changing to some oral regimen or increasing the gap between doses as was recommended in certain guidelines. Postlockdown some inpatient chemo protocols were given in the day-care setting. Richards M et al., revealed from a study that their patients missed at least one chemotherapy session. In the same study reports of centers reducing their outpatient visits and switching to virtual clinics were received [19].

In-patient admissions declined to a similar extent during the lockdown and non lockdown periods (31.44% and 31.64%, respectively). The reason being the admissions for the patient receiving chemotherapy were curtailed by oncologists throughout 2020, and a shift towards day care based chemo sessions occurred for those malignancies which previously had an inpatient chemo protocol. Further, evaluation on an inpatient basis was deferred. This was to minimise hospital stays as outbreaks of COVID-19 were reported in inpatient units. Kutikov A et al., in Chase Cancer center provided a consensus-based broad recommendation on decisions about immediate cancer treatment during the COVID-19 crisis but cautioned that oncologic opinion for individual patients and differences in healthcare systems should be kept in mind [20]. Patt DA et al., in a study of Medicare billing on American seniors found that there was a decrease in cancer screening, physician Evaluation and Management (E&M), chemotherapy administration, and surgeries among cancer patients in that database. The study concluded that these delays might lead to tumour-stage migration and increased mortality [21].

Although, the reduction in patient footfall and journey through the cancer care continuum in the hospital were involuntary or imposed by the lockdown, the decline was also observed due to the adjustment in the care protocols like teleconsultations, deferment of chemotherapy, or switching to oral therapy and thoughtful reduction in admissions. A cross-continental survey conducted by Jazieh AR et al., demonstrated that most of the cancer centers faced challenges in maintaining the same level of care as before the pandemic, and therefore, they reduced or adjusted their services to different degrees [22]. The developed world made use of technology [3] and other resources to compensate for the impact and developing countries like India including our tertiary care hospital also followed similar norms to ward off adverse impacts on cancer care [4,5]. The adaptations like the virtual clinic mode may stay beyond the

pandemic and continue as a new norm for which further evidence is required to accept and implement the positives and lay off the negatives [23].

Limitation(s)

One of the limitations of this study is that it provides just the tip of the iceberg impact of COVID-19 pandemic on cancer care. Detailed information regarding the cancer care providing system and its impact on disease progression, mortality, prognosis, and COVID-19 related complications and deaths need to be assessed to get outcome-based results. Furthermore the study was unicentric and the impact on patients in terms of disease progression due to delayed/deferred care was not studied

CONCLUSION(S)

This study reveals that COVID-19 pandemic significantly reduced majority of aspects of cancer care. All the parameters in terms of number and percentage of outpatient visits, registrations, admissions and chemotherapy doses revealed a decline during the eight months of study period in 2020 compared to the prepandemic year of 2019. The drop in all parameters was more profound during the strict lockdown of April and May 2020. All parameters, except admissions returned to and even overshoot the prepandemic comparison months towards the end of the year. Adaptive measures such as teleconsultations and reorganising cancer care delivery within hospitals can mitigate the negative impact of COVID-19 or any future pandemic. Therefore, future strategic planning must consider provision of transport/ambulance services during lockdown and other strategies for the maintenance of the continuum of care for essential services like cancer care.

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