

# THE IMPACT OF COVID-19 PANDEMIC IN CHILDREN WITH CANCER: A REPORT FROM SAUDI ARABIA

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## Abstract

**Background:** On January 2020, the WHO declared the novel coronavirus (2019-nCoV) outbreak as a public health emergency of international concern. Due to rapid spread 2019-nCoV, all countries started preventive and precautionary measures to prevent COVID-19 infection spread. These measures limited the population mobility and services provided, which subsequently impact of on children with cancer and cancer care delivery in the many health centers in Saudi Arabia. **Procedure:** We did a cross sectional study to assess the impact on this outbreak on children with cancer with regard to all aspects of life including medical services provided, the specific precautions to prevent spread in cancer patients, mental, psychological effect and its affection on quality of life. **Results:** We collected 204 responses during a survey which assessed the impact on the treatment of cancer children at a tertiary institution during the COVID-19 pandemic. The majority of patients were receiving ongoing chemotherapy for leukemia/lymphoma. The majority of these patients (60.5%) reported a delay in treatment received due to hospital cancellation. Although, the majority of patients in our cohort complained of delayed treatment, fortunately none of the delays led to fatalities. In the context of global lockdowns and physical distancing to help flatten the COVID-19 curve, telemedicine has proved fundamental to keeping patients and their healthcare providers connected and safe. Children also faced multiple other difficulties such as psychosocial issues during the COVID-19 pandemic. **Conclusion:** Our long-term goals are to develop new programs which will enable children with cancer to emerge successfully during a pandemic.

## 1. INTRODUCTION

The coronavirus SARS-CoV-2 causes the disease COVID-19, that has become a pandemic and global crisis. It was initially identified in Wuhan, China in December 2019, and has spread worldwide since (1). While this infection has proved to be a threat to adults, especially the elderly and people who are already immunocompromised, children seem to be at a low risk for serious COVID-19 infections (2, 3, and 4). This includes children who are being treated for cancer, despite being immunocompromised (5). However, even though children are minimally affected by the Corona Virus Disease, those patients that do succumb to the virus suffer from severe complications (6,7) and are also severely impacted by the psychosocial consequences of this pandemic (8,9,10).

The approach to combat the virus in most countries all over the world has been more or less similar. Hospitals have resorted to directing most services to patients with COVID-19, reducing or even halting most elective care. Drastic measures such as limiting the number of hospital guests, no entry of individuals into

the hospital with symptoms suggestive of COVID-19 infection until a viral test is negative, postponing all follow-up outpatient visits and appointments, avoiding physical contact with patients, isolating children in their hospital rooms and mandatory personal protective gear are some of the measures implemented by hospitals during the pandemic (1).

Cancer children on chemotherapy require regular outpatient assistance, intermittent hospital admission and support therapy for appropriate therapy delivery. The impact of the COVID-19 pandemic and hospital precautionary measures on these group of patients would therefore have critical consequences because they risk receiving sub- optimal care.

**MATERIALS AND METHODS**We performed a cross sectional observational study for children diagnosed with cancer at the Prince Sultan Military Medical City in Riyadh. The aim of our survey was to assess the impact of the COVID-19 pandemic on children with cancer with regards to the medical service provided, precautionary measures implemented by the hospital cancer unit to prevent the spread of infection, the acceptance of virtual platforms utilized during the pandemic and the psychological and mental impact of the pandemic in children already diagnosed with a fatal disease. The study was approved by the ethics committee with IRB number: 1374 (HP-01-R079). To achieve our objective, we designed a voluntary anonymous and targeted questionnaire after extensive literature review of the recent COVID-19 publications concerning cancer patients. Our inclusion criteria was all children between the ages of 0-14 years diagnosed with or recently diagnosed with cancer. Participating parents were asked to complete the booklet type survey questionnaire at the clinic visit during the pandemic or via a virtual platform. Data was collected on and Excel spreadsheet for analysis.

**STATISTICAL ANALYSIS**We used descriptive statistics to analyze patient demographic data. We qualitatively analyzed the responses using pie chart and graphic data generated by the software programme.

## RESULTS

### RESULTS OVERVIEW

We collected 204 responses from cancer patients, 64% of the data was collected personally in the clinic and 36% was collected via phone calls and telemedicine (Figure 1).The majority of patients were diagnosed with cancer prior to the pandemic (93%) and 7% were diagnosed with cancer during the pandemic.

### CANCER TYPE AND THERAPY RELATED RESULTS:

Of the 204 cancer patients, 60.4% patients were receiving ongoing chemotherapy for leukemia /lymphoma and 39.6% for solid tumors. There were 68.7% of patients receiving ongoing chemotherapy and the remainder of the patients were in remission or on regular follow up.

Of the 204 responses, 63% of patients reported a delay in treatment received during the COVID-19 pandemic and 37% of patients reported no delay in treatment (Figure 2)

Patients on chemotherapy experienced treatment delay for various reasons listed in Table 1.The majority of patients (53.3%) reported hospital cancellation as the main reason for treatment or procedure delay during the COVID-19 lockdown and city curfew. There were a total of 30.8% of patients who reported non - availability of adequate PPE, lack of cancer support and shortage of medications as a major challenge faced during the pandemic.

### TELEMEDICINE VERSUS HOSPITAL VISIT RESULTS

Of the 204 responses, 65% reported a preference for telemedicine and virtual clinic visits of which 80% reported a fear of contracting the virus as the main reason for this preference. The remaining patients preferred telemedicine visits for heterogeneous reasons such as living outside the city or transport difficulties faced during hospital visits.

The minority of patients (35%) reported a preference for hospital visits due to the perception of more accurate assessments received during personal interaction with the physician (Figure 3).

In addition, 57.3% of patients strongly agreed to continue attending virtual clinics after the pandemic while 31% strongly disagreed to continue the virtual clinics. A minority of patients (11.7%) preferred personal group settings to a mild degree.

## **HOSPITAL PRECAUTIONS, SAFETY AND EDUCATION RESULTS**

Fewer patients (40%) felt safe to visit the hospital during the pandemic compared to 55.3% of patients who did not feel safe to visit the hospital during the outbreak primarily for fear of contracting the virus in a high risk setting such as hospitals.

All patients adhered to the safety precautions as advised when visiting the hospital and most patients (97%) were satisfied with the hospital precautions implemented to minimize the risk of infection (Figure 4).

Of the 204 responses, 44.2% of patients reported having received the patient education materials provided by the hospital while 55.8% of patients did not receive these materials suggesting improvement in patient education provided by the hospital as a point of contention.

## **CHILDRENS MENTAL STATUS RESULTS**

The majority of parents (70.2%) reported that the child had a reasonable understanding of the virus and its potential adverse outcomes. When asked about COVID-19 effects on cancer patients, 90.1% reported a heightened awareness.

While the majority of patients (87.8%) of patients did not report an incidence of a family member being affected by COVID-19, 94.8% of patients were fearful of themselves or a family member contracting the virus. The cancer patients appeared overall more concerned about the complications which may result from contracting the virus than the general public with 53.5% of positive responses.

## **CHILDRENS MENTAL HEALTH RELATED RESULTS**

The majority of patients (81.3%) of patients experienced an adverse effect on the quality of life during the pandemic predominantly due to limitation in social activities, social isolation, feeling anxious, afraid and alone.

There were 67.4% of parents that were concerned about new onset behavioral occurrences in their children. Behavioral and mental characteristics reported are documented in Table 2.

## **SURVEY OF PATIENT RECOMMENDATIONS**

Patients gave a myriad of recommendations for improving hospital service during the pandemic as listed in Table 3.

## **DISCUSSION AND RECOMMENDATIONS**

We collected 204 responses during a survey which assessed the impact on the treatment of cancer children at a tertiary institution during the COVID-19 pandemic. The majority of patients were receiving ongoing chemotherapy for leukemia/lymphoma. The majority of these patients (60.5%) reported a delay in treatment received due to hospital cancellation. The general consensus emerging from high risk countries such as Italy and China following the COVID-19 pandemic was to postpone emergency treatments or elective surgery for cancer patients (11, 12, 13, 14), however the impact of treatment delay on the risk for cancer children is currently lacking.

Although, the majority of patients in our cohort complained of delayed treatment, fortunately none of the delays led to fatalities. Nevertheless, we recommend that a forced delay in treatment due to precautionary measures in future should be considered on a case by case basis for each patient to avoid critical patients not receiving adequate therapy.

The survey also highlights the requirement of hospitals to improve the pharmaceutical supply chain to avoid delay in patients receiving critical cancer therapies within critical time. We recommend that pharmacy

departments administer home based therapies in sufficient quantities for patients in order to minimize the requirement for hospital visits.

Overall, patients did not feel safe to visit the hospital during the pandemic due to fear of contracting the virus in a high- risk setting, however when visiting the hospital they were satisfied with the hospital precautionary measures implemented. The majority of patients reported a preference for telemedicine, a precautionary measure adopted by most hospitals worldwide. Of the 204 responses, 65.1% reported a preference for telemedicine and virtual clinic visits of which 80% reported a fear of contracting the virus as the main reason for this preference. The majority of patients gave positive responses for a continuation of telemedicine post pandemic.

In the context of global lockdowns and physical distancing to help flatten the COVID-19 curve, telemedicine has proved fundamental to keeping patients and their healthcare providers connected and safe. Many practitioners all over the world report that online consultations are proving to be an effective and sustainable patient-care solution. It offers convenient care from the privacy and comfort of one's own home. It has proven invaluable in allowing patients to keep their physical distance while continuing to receive medical care. It is especially useful to ensure continued care for those with chronic conditions, such as children with cancer, so as to help them overcome any misinformation that may add to their anxiety. It provides healthcare services to people who live in remote areas and also enables worldwide communication among practitioners and patients. We recommend a systematic approach for the physician to adhere to in order to improve the telemedicine consultation for children with cancer as follows:

- Take a full history of the patient with regard to new symptoms or complaints
- To triage those who are in need of hospital care from those who can be managed via telemedicine.
- Obtain the history of presenting illness, side effects of chemotherapy associated signs and symptoms.
- Establish medication review
- Observations: e.g. breathing, side effects of chemotherapy
- Take the vital signs that are able to be taken by thorough explanation to care giver

The most concerning results of the survey was the impact of the pandemic on the mental health status of children. Parents of children reported a heterogeneous array of concerning behavioral changes of children during the pandemic.

Studies indicate that the pandemic could have negative effects on both children's physical and mental health currently and in the long-term. Being quarantined in homes and institutions may result in a greater psychological burden than the physical sufferings caused by the virus (15). School closure, lack of outdoor activity, new dietary regimens and sleeping patterns are likely to disrupt children's usual lifestyle and can potentially result in boredom, impatience, agitation, frustration, anxiety and neuropsychiatric manifestations (16).

Children diagnosed with cancer suffer unique problems. While processing the diagnosis of cancer is hard enough, the implications of COVID-19 makes it harder to fully grasp the implications of this new disease on their current ill health (17).

Global research indicates that healthcare for children with cancer should include psychological services to prevent long-term emotional and behavioral problems (18, 19, and 20). This must not be halted due to COVID-19, but rather increased. These services must be delivered in an age-appropriate, developmentally appropriate, and time-sensitive manner.

In order to mitigate the psychosocial ill-effects of COVID-19 on children, proactive and targeted interventions can be proposed. Parents, pediatricians, psychologists, social workers, hospital authorities, government and non-governmental organizations have important roles to play to make the mission successful. It is essential for healthcare professionals to establish multidisciplinary mental health taskforce teams comprised of psychiatrists, psychiatric nurses, clinical psychologists and other mental healthcare works to provide psychological support to children diagnosed with cancer. Hospitals need to be aware of the social needs of children and make necessary arrangements to maintain communication with their support networks. The

use of technology such as audiovisual devices may prove to be useful.

### **CONCLUSION:**

Children with cancer in our institution have faced multiple difficulties including therapy-related and psychosocial issues during the COVID-19 pandemic. However, with proper intervention such as the censored and supervised use to telemedicine and improving the pharmaceutical supply chain to avoid medication delay, children will hopefully emerge from this trying time with unmatched resilience, pliability, solicitude, and cognizance.

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### **COMPLIANCE WITH ETHICAL STANDARDS:**

We complied with the ethical standards set out in our objective. All questionnaires submitted to patients had informed consent documented with confidentiality clauses.

### **CONFLICT OF INTEREST:**

The authors declare no conflicts of interest.

### **ETHICS APPROVAL:**

This study was submitted to the Institutional Review Board of Prince Sultan Military Medical City, Riyadh Saudi Arabia, and was approved by the Research Advisory Committee through established procedures. The IRB number allocated is 1374 (HP-01-R079).

### **DECLARATIONS:**

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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## APPENDIX:

**Table 1: Reasons for delay of treatment during the COVID-19 pandemic.**

Hospital cancellation
Hospital with limited capacity
Risk of infection increased in hospital environment
City lock down and curfew
Swab requirements prior to admission

Hospital cancellation
Current Infection by COVID-19

**Table 2: Behavioral and mental characteristics of cancer children**

Behavior of concern:	Percentage of occurrence in cohort:
Anxious about contracting the virus	96%
General Anxiety with symptoms	52.7%
Anger	29.7%
Depression	26.3%
Fear	19.8%
Insomnia and nightmares	12%

**Table 3: Recommendations to improve Hospital service during the pandemic**

Improve pharmacy services during the pandemic to avoid medication delays
Allow one visitor to accompany the patient
Further availability of education material provided by hospital
Delineate clear treatment plan for COVID-19 positive cases
Reduce number of attendees per clinic to reduce waiting time of patients

**LEGENDS:** Figure 1: Summary of responses

Figure 2: Percentage of delay in treatment of procedure COVID-19 pandemic

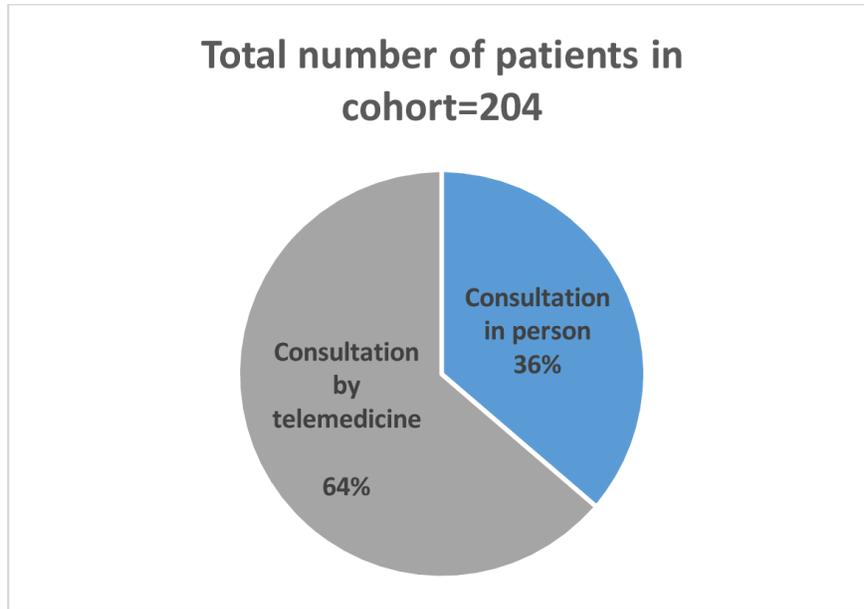
Table 1: Reasons for delay of treatment during the COVID-19 pandemic.

Figure 3: Percentage of telemedicine versus hospital visits

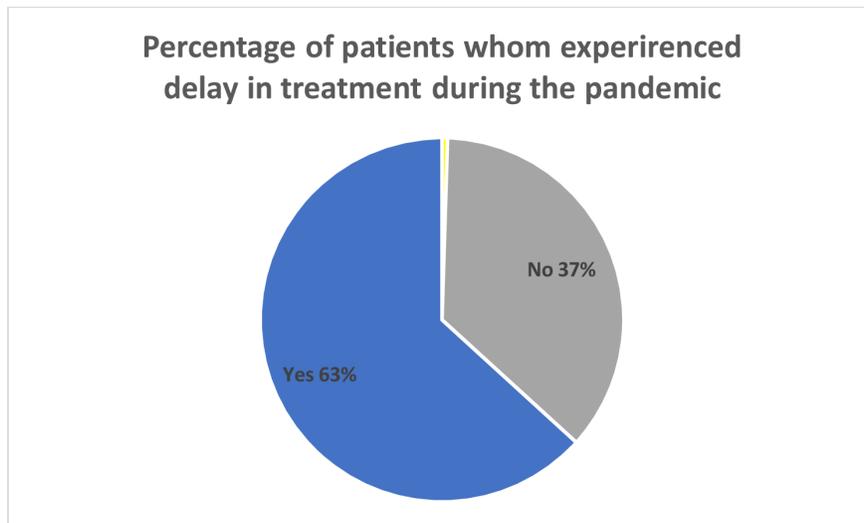
Figure 4: Patient satisfaction with hospital precautions

Table 2: Behavioral and mental characteristics of children with cancer

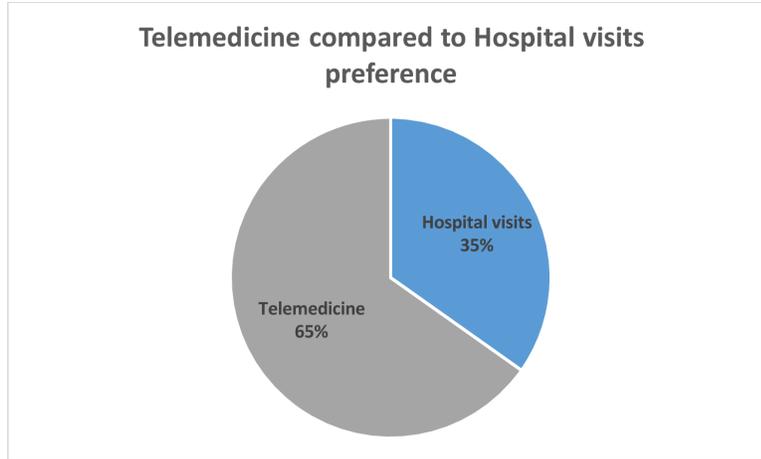
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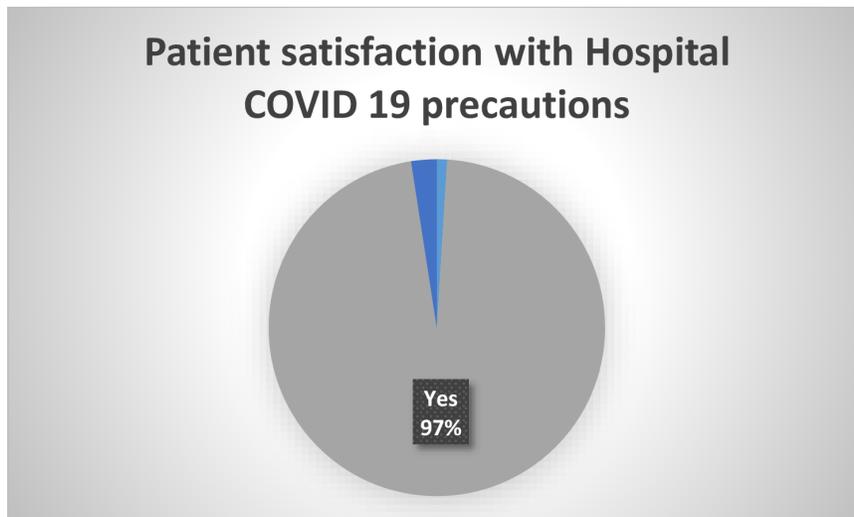
**FIGURE 1: Summary of responses.**



**FIGURE 2: Percentage of delay in treatment during the COVID-19 pandemic**



**FIGURE 3: PERCENTAGE OF PATIENTS PREFERING TELEMEDICINE VERSUS HOSPITAL VISITS**



**FIGURE 4: Majority of the patients (97%) were satisfied with Hospital precautions.**