


Impact of COVID-19 measures on a paediatric oncology outreach-program

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Funding information

Foundation World Child Cancer NL, AFAS Foundation

KEYWORDS

childhood cancer, collateral damage, COVID-19, outreach-program, sustainability

Key points

- Paediatric oncology outreach-programs have been effective development interventions to reduce inequalities in healthcare between high-income countries (HIC) versus low and middle-income countries (LMIC). Little is known about their sustainability during times of a pandemic
- This study assesses the impact of COVID-19 government measures on a paediatric oncology outreach-program between three large referral hospitals in Netherlands (HIC), Indonesia (LMIC) and Kenya (LMIC)
- COVID-19 government measures have impacted childhood cancer care at all three hospitals. However, disruptions in services are more prominent at partner sites in LMIC, increasing existing inequalities
- COVID-19 government measures have adversely affected the wellbeing of children with cancer in both HIC and LMIC, and the chances of survival of children with cancer in LMIC
- Government leaders and policy makers should take collateral damage of their COVID-19 policies and local settings into account to protect children with cancer in LMIC

1 | INTRODUCTION

Annually about 400,000 children worldwide develop cancer.¹ Around 90% of these children live in low and middle-income countries (LMIC). Whether a child can be cured from cancer depends largely on the place where the child lives. Childhood cancer survival is close to 80% in high-income countries (HIC) and often less than 30% in LMIC.¹ Hospitals try to close this gap in childhood cancer survival by participating in outreach-programs.

Outreach-programs are a relatively new multi-disciplinary intervention approach addressing diagnostics, treatment and care. The concept is based on a cross-cultural, reciprocal process where

various groups work together to achieve joint goals. Outreach-programs in paediatric-oncology are one of the medical success stories of the last 50 years and essential for achieving the third Sustainable Development Goal of ensuring healthy lives and promoting wellbeing for all at all ages. Outreach-programs are an effective way for transfer of knowledge, skills and expertise between HIC and LMIC.²

Little is known about the sustainability of paediatric-oncology outreach-programs during a pandemic. This study assesses the impact of COVID-19 government measures on an outreach-program between three large referral hospitals in Netherlands, Indonesia and Kenya.

2 | METHODS

2.1 | Setting

A longstanding close collaboration exists between Princess Máxima Center in Netherlands (HIC), Dr Sardjito General Hospital in Indonesia (LMIC) and Moi Teaching and Referral Hospital in Kenya (LMIC). The Dutch hospital is a paediatric-oncology specialised centre, while the other two are general hospitals with paediatric-oncology units (Table 1). All three sites are public hospitals. A memorandum of Understanding formalises the collaboration and is renewed every 5 years.

2.2 | Study design and analysis

The head from each paediatric-oncology partner site was interviewed in June 2021, using a self-administered semi-structured questionnaire, to explore the impact COVID-19 government measures have on a paediatric-oncology outreach-program. All respondents were physicians. This cross-sectional descriptive study compared COVID-19 screening, availability of resources, treatment provision, condition of patients, and altered nature of outreach-program of three participating sites. The questionnaire was developed based on literature review.³⁻⁶ The questionnaire contained 30 closed-ended and 8 open-ended questions and took 15–20 min to complete at home or inside the hospital. Closed-ended questions were evaluated on two to five-point rating scales. Informed consent was obtained and respondents reviewed and approved the final report.

3 | RESULTS

3.1 | COVID-19 screening

Routine screening for COVID-19 (symptoms or exposure screening, temperature checks, testing) and personal protective

equipment were available at all three hospitals. Cumulative number of patients tested positive for COVID-19 was <100 at Dutch hospital, >100 at Indonesian hospital, and unknown at Kenyan hospital.

3.2 | Availability of resources during COVID-19 pandemic

Financial support from public or governmental institutions for regular and paediatric-oncology care decreased at the Kenyan hospital, but not at Indonesian or Dutch hospitals. Only the Indonesian hospital reported temporary reduction of inpatient beds for paediatric-oncology. At Kenyan and Indonesian hospitals availability of clinical staff decreased due to COVID-19 infections among staff, quarantine after exposure, and diversion to COVID-19 care (Table 2).

3.3 | Childhood cancer treatment during COVID-19 pandemic

Although treatment shortcomings existed in Indonesia and Kenya prior to the pandemic, it worsened importantly during lockdowns. Certain chemotherapeutic agents were no longer available. For example, 6-mercaptopurine and actinomycin were lacking for over 1 year in Indonesia due to disrupted global supply chains. Chemotherapy administration was delayed or modified due to travel restrictions and lockdowns at both hospitals. Also availability of blood products was limited. For example, blood supplies in Kenya depend significantly on blood donations of students. With school and university closures a shortage of blood products resulted. Disruptions in access to radiotherapy, surgical care, and life-saving interventions (e.g. transfer to intensive care unit) was encountered at Kenyan hospital. Parental education programs and parent support meetings, to ameliorate adherence, facilitate psychosocial coping and reduce

TABLE 1 Characteristics partner sites of paediatric-oncology outreach-program

	Dutch hospital	Indonesian hospital	Kenyan hospital
COUNTRY CHARACTERISTICS:			
Population	17 million	273 million	52 million
World Bank Country Classification	HIC	LMIC	LMIC
HOSPITAL CHARACTERISTICS:			
Annual childhood cancer diagnoses	600	180	200
Paediatric-oncology bed capacity	85 beds	41 beds	35 beds
Staff:			
- Doctors	90	5	4
- Nurses	240	28	19
Childhood cancer survival	75%	30%	30%

Abbreviations: HIC, high-income countries; LMIC, low and middle-income countries.

TABLE 2 Impact COVID-19 measures on paediatric-oncology outreach-program

	Dutch hospital	Indonesian hospital	Kenyan hospital
CHILDHOOD CANCER TREATMENT:			
Reduction of inpatient beds	-	X	-
Medical staff shortage	-	X	X
Chemotherapy not or less available	-	X	X
Chemotherapy administration delayed/modified	-	X	X
Radiotherapy postponed	-	-	X
Surgery postponed	-	-	X
Blood products deficits	-	X	X
Life-saving interventions less accessible	-	-	X
Limited surveillance patients who completed treatment	X	-	-
Routine laboratory tests disrupted	-	-	-
Pathology services disrupted	-	-	-
Imaging disrupted	-	-	-
Supportive care services disrupted	-	-	-
CHILDHOOD CANCER PATIENTS:			
Reduction in suspected and new diagnoses	-	X	-
Delayed presentation	-	X	X
Loss of family income	X	X	X
Food insecurity	-	-	X
Malnutrition	-	-	X
Limited access to school education	X	X	X
Mental health issues	X	X	X
OUTREACH ACTIVITIES:			
Cancer registry disrupted	-	X	X
Treatment protocol evaluation disrupted	-	X	X
Parental education program ^a disrupted	-	X	X
Parent support meetings ^a disrupted	-	X	X
Mutual short and long-term site visits disrupted	X	X	X
International master course disrupted	X	X	X
Teleconferences to discuss clinical cases disrupted	-	-	-
International PhD-programs disrupted	X	X	X
International medical scientific traineeships stopped	X	X	X

Note: X = Impacted by COVID-19 government measures according to doctor report.

^aParental education program and parent support meetings, which are an integral part of international PhD-trajectories within the outreach-program, are the main psychosocial services provided to families of children with cancer in Indonesian and Kenyan hospital.

treatment abandonment, were modified and temporarily stopped at Indonesian and Kenyan hospitals. Only the Dutch hospital continued to provide limited surveillance of patients who had completed treatment through the use of video-consults. It is likely that the LMIC provided less long-term follow-up of cancer survivors even pre-pandemic.

3.4 | Childhood cancer patients during COVID-19 pandemic

The number of suspected or newly diagnosed patients decreased considerably at Indonesian hospital during periods with stricter government measures. Delayed presentation of childhood cancer

patients was reported at Indonesian and Kenyan hospitals, which may lead to more advanced stages of disease and worse prognosis.

3.5 | Influence of COVID-19 measures on childhood cancer patients

Based on observations and conversations with families, doctors from all three hospitals reported that government measures (face masking, physical distancing, travel restrictions, lockdowns) adversely impacted children with cancer through loss of family income, limited school access and mental health issues. Poverty and unemployment increased. Food insecurity and malnutrition increased susceptibility for potentially lethal infectious diseases. School closures and online-schooling appeared to harm children's spirit to learn, and cognition and overall development. Some children lacked access to digital devices, dropped-out and may never resume school again. Due to lockdowns children and their parents became more isolated and suffered from mental health issues, such as stress, anxiety and depression according to the opinion of respondents. This was exacerbated by uncertainties about when pandemic and concomitant financial hardships will end. Dutch and Indonesian doctors considered consequences of government measures worse than virus disease itself for children.

3.6 | Influence of COVID-19 measures on paediatric-oncology outreach-program

Physical interaction between medical multidisciplinary teams of all three hospitals slowed down during pandemic. Mutual short and long-term visits, workshops, and on-site trainings stopped. Adequate transfer of knowledge, skills and expertise was hindered. Mentorship that was to take place between staff could not take place. Teleconferences to discuss clinical cases were not disrupted in any of the hospitals. Research activities were delayed or halted. Cancellation of medical scientific traineeships implied that help with updating cancer registries and gaining insight in treatment outcomes to monitor efficacy of protocols decelerated. Despite observed mental health issues, parental education programs and parent support meetings were modified and temporarily stopped to comply with imposed physical distancing requirements at the Kenyan and Indonesian hospital, but not at the Dutch hospital.

4 | DISCUSSION

Paediatric-oncology outreach-programs have been effective development interventions to reduce inequalities in healthcare.² This exploratory study reveals that COVID-19 government measures negatively impact childhood cancer care at all three hospitals and their outreach-program. However, some hospital services were more affected than others. In the Dutch hospital only one disruption was

reported which is a decrease in surveillance-evaluations for patients who completed cancer treatment. In the Indonesian and Kenyan hospitals multiple disruptions were reported. For example, reduced number of cancer diagnoses, delayed presentations, medical staff shortages, limited availability of chemotherapy and blood products, and delayed or modified treatment administration. At all three hospitals loss of family income, limited school access and mental health issues were witnessed. COVID-19 pandemic decelerated interaction between medical teams of all three participating institutions. Appropriate knowledge conveyance was hampered. Joint scientific activities were postponed or stalled.

The COVID-19 pandemic poses an unprecedented global threat to paediatric cancer care with disrupted diagnosis, treatment, follow-up and clinical-trial enrolment.³ In Spain, a study showed that all paediatric-oncology early-phase clinical-trial units encountered difficulties with patient enrolment, treatment continuity, trial assessments, and personnel shortages. Monitoring activity was 73% of time postponed and 49% of on-going trials were interrupted.⁴ In Turkey, an audit at large paediatric-oncology hospital showed significant disruptions at admissions, chemotherapy, surgery, and radiotherapy.⁵ A cross-sectional survey among 453 paediatric onco-haematologists from 20 LMIC in Latin-America illustrated disruptions in outpatient consultations, surgeries, radiotherapy, stem-cell transplantation, palliative care, and clinical staff availability.⁶ A similar study among 213 institutions in 79 countries concluded that COVID-19 pandemic disrupted childhood cancer care globally.⁷ In LMIC these disruptions are however more prominent.^{3,7}

Governments of HIC and LMIC implemented similar measures to restrict virus spread. Its collateral damage was similar around the world as well: economic loss, mental health issues, and reduced healthcare access. However, collateral damage of government measures is worse in LMIC than in HIC. This further exacerbates existing socio-economic and medical inequalities between HIC versus LMIC.^{8,9} Our study also revealed that healthcare systems in HIC are better equipped against a pandemic than in LMIC. Children with cancer at our Indonesian and Kenyan partner sites were more affected than at our Dutch site. This is especially poignant as COVID-19, with an Infection Fatality Rate of less than 0.05% in children, constitutes seldom a threat to youth.¹⁰

This study has various restrictions. Future research is required to determine rise in treatment failures and reduction in survival of children with cancer. In addition, we only interviewed one representative of each partner site. Our report describes situation in single outreach-program between three nations on three continents, and may therefore not be representative for international collaborations covering other world regions.

In conclusion, our paediatric-oncology outreach-program has been adversely affected by COVID-19 government measures. Disruptions in childhood cancer care services are more prominent in LMIC, increasing existing inequalities. Government leaders and policy makers should consider collateral damage of their policies and try to mitigate it by balancing the potential threat of COVID

with measures that do not result in as much disruption and damage to children and families.

ACKNOWLEDGEMENTS

The authors are grateful for the support received by Ajay Bailey, the Foundation World Child Cancer NL and the AFAS Foundation.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

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

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How to cite this article: El Salih I, Widjajanto PH, Njuguna F, Kaspers G, Mostert S. Impact of COVID-19 measures on a paediatric oncology outreach-program. *Psychooncology*. 2022;31(5):860-864. <https://doi.org/10.1002/pon.5934>