International Journal of Multidisciplinary Research and Growth Evaluation
ISSN: 2582-7138
Received: 10-11-2021; Accepted: 15-12-2021
www.allmultidisciplinaryjournal.com
Volume 2; Issue 6; November-December 2021; Page No. 401-408

Cancer Care Management in the COVID-19 Era: Challenges and adaptations in the global south

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DOI: https://doi.org/10.54660/.IJMRGE.2021.2.1-581-588

Abstract
The COVID-19 pandemic significantly disrupted healthcare systems worldwide, with profound implications for cancer care management, particularly in the Global South. This abstract examines the challenges faced and adaptations implemented in resource-limited regions during the pandemic. Cancer care services, including diagnosis, treatment, and follow-up, were severely affected due to healthcare resource reallocation, lockdown measures, and financial constraints. Vulnerable cancer patients faced increased risks due to immunosuppression and heightened susceptibility to COVID-19. In addition, socio-economic disparities and rural-urban healthcare inequities further exacerbated access challenges in low- and middle-income countries. In response to these challenges, innovative adaptations emerged to sustain cancer care delivery. Telemedicine was widely adopted for follow-up consultations and symptom management, though its implementation was hindered by limited digital infrastructure in rural areas. Decentralized care models, including community-based clinics and the training of local healthcare workers, ensured treatment continuity. Adjusted treatment protocols, such as shortened chemotherapy regimens and alternative radiation schedules, minimized hospital visits while maintaining care standards. Collaborative efforts involving governments, non-governmental organizations, and international agencies mobilized resources to support patients during the crisis. Additionally, targeted vaccination campaigns prioritized cancer patients and healthcare workers, mitigating infection risks in oncology settings. These adaptations underscore the resilience and innovation within healthcare systems in the Global South. However, they also highlight the urgent need to address structural inequities, strengthen healthcare infrastructure, and build more robust, crisis-ready oncology systems. Lessons learned from this period can inform future strategies for improving cancer care delivery in resource-constrained settings, ensuring equitable and sustainable healthcare for vulnerable populations.

Keywords: Cancer care, COVID-19 Era, Global south, Review, Healthcare

1. Introduction
The COVID-19 pandemic has disrupted global healthcare systems on an unprecedented scale, with far-reaching implications for the management of chronic diseases, including cancer (Segelov *et al*., 2020). As one of the leading causes of mortality worldwide, cancer care relies heavily on timely diagnosis, regular treatment, and coordinated follow-up. However, the pandemic created significant barriers to these critical components, threatening the progress made in oncology over the past decades (Paterson *et al*., 2020). The global impact of COVID-19 on cancer care highlights disparities in healthcare systems, revealing how resource constraints, inequities, and systemic inefficiencies exacerbate vulnerabilities in certain regions (Benfer *et al*., 2019; Bhaskar *et al*., 2020). This challenge is particularly acute in the Global South, where healthcare systems already face significant limitations in infrastructure, workforce, and financial resources.
Globally, cancer care challenges during the COVID-19 pandemic have manifested in multiple forms (Tsamakis *et al*., 2020). Healthcare facilities redirected resources and personnel to handle surging COVID-19 cases, leading to delays in cancer diagnosis, treatment interruptions, and postponed follow-ups. The suspension of elective surgeries

combined with shortages of chemotherapy drugs and disruptions in the supply chain, further impeded care delivery. Cancer patients, who are often immunosuppressed due to their disease or treatment, faced heightened risks of severe COVID-19 infection, complicating the management of their condition (Patel *et al*., 2020). Moreover, fear of contracting the virus discouraged many patients from seeking care, resulting in late-stage diagnoses and poorer outcomes. These challenges were compounded by pandemic-induced economic crises, making cancer treatment even less affordable for vulnerable populations.

In the Global South, these challenges were amplified by unique healthcare realities. Many low- and middle-income countries (LMICs) struggle with underfunded healthcare systems, limited access to advanced cancer therapies, and a shortage of oncologists (Rubagumya *et al*., 2020). Urban-rural disparities in healthcare availability often leave rural populations without adequate oncology services. Additionally, weak digital infrastructure in many parts of the Global South hindered the adoption of telemedicine as an alternative to in-person consultations. Social determinants of health, such as poverty, education, and geographic location, further restricted access to cancer care, disproportionately affecting marginalized communities. The pandemic also exposed gaps in healthcare preparedness, highlighting the need for resilient systems capable of managing concurrent health crises (Quigley *et al*., 2020).

Despite these challenges, the pandemic served as a catalyst for innovation in cancer care delivery. Many healthcare systems in the Global South adopted creative solutions to address disruptions and improve care outcomes. Telemedicine, although limited in reach, emerged as a vital tool for ensuring continuity in patient care, particularly for follow-ups and symptom management (Byrne, 2020). Decentralized care models, such as the use of community health workers and satellite clinics, helped bridge access gaps in rural areas. Treatment protocols were adapted to reduce hospital visits, with simplified chemotherapy regimens and alternative radiation schedules gaining traction (Parashar *et al*., 2020). Collaboration among governments, non-governmental organizations (NGOs), and international agencies facilitated resource mobilization to support cancer patients during the crisis.

Analyzing these challenges and adaptations is critical for shaping the future of cancer care in resource-limited settings (Rahman *et al*., 2019). The pandemic has underscored the importance of building resilient healthcare systems capable of responding to both routine and emergency needs. By understanding the unique healthcare realities of the Global South, stakeholders can identify strategies to address inequities, improve access, and enhance outcomes for cancer patients (Alli and Dada, 2021). Such analysis also provides valuable insights for preparing healthcare systems to handle future crises, ensuring that vulnerable populations are not disproportionately affected (Shadmi *et al*., 2020).

This review explores the challenges faced in cancer care management during the COVID-19 pandemic, with a specific focus on the global south. It examines the adaptations implemented to mitigate these challenges and highlights the lessons learned for improving oncology care in resource-constrained settings. By doing so, it aims to contribute to the growing body of knowledge on global health resilience, emphasizing the need for equitable and sustainable healthcare solutions in the post-pandemic era. Through this lens, the discussion aims to inspire policy-makers, healthcare providers, and researchers to prioritize cancer care innovations that address the unique needs of the Global South.

2.0 Methodology

The PRISMA methodology offers a systematic approach to addressing the complexities of cancer care management in the COVID-19 era within the Global South. It begins with identifying challenges unique to this context, such as disrupted healthcare access, delayed diagnostics, and limited resources exacerbated by the pandemic. The methodology prioritizes understanding the socio-economic disparities that hinder equitable care delivery and the heightened vulnerability of cancer patients to COVID-19.

Research involves gathering data on the pandemic's impact on cancer care, including treatment delays, reduced screening rates, and healthcare system overload (Cancino *et al*., 2020). Qualitative and quantitative methods are used to evaluate the adaptability of existing systems and identify gaps. This research phase incorporates stakeholder engagement, including healthcare professionals, policymakers, patients, and community representatives, to ensure a comprehensive understanding of the challenges and potential solutions. Implementation focuses on deploying evidence-based interventions tailored to the Global South's unique context (Yapa and Bärnighausen, 2018). These may include telemedicine adoption, decentralized care delivery models, and targeted financial assistance programs to reduce care inequities. Partnerships with local governments, non-governmental organizations, and international bodies play a critical role in resource mobilization and program execution.

Monitoring ensures continuous evaluation of implemented strategies. Key performance indicators, such as patient outcomes, treatment completion rates, and system resilience metrics, are tracked to assess effectiveness. Real-time feedback mechanisms are established to identify areas requiring immediate adjustments (Deeva *et al*., 2021). Adaptation is a dynamic phase that emphasizes flexibility in response to evolving pandemic conditions. Lessons learned from the initial phases guide refinements to interventions, enabling the system to remain responsive to emerging challenges and opportunities. Sustainability focuses on embedding the successful strategies into long-term cancer care frameworks. Emphasis is placed on building resilient healthcare systems that can withstand future crises while addressing the structural inequities highlighted by the pandemic. This involves policy advocacy, capacity building, and securing funding for enduring improvements in cancer care access and quality. Through this iterative and context-specific approach, the PRIMAS methodology ensures that cancer care management in the Global South evolves to meet the demands of the COVID-19 era while laying the groundwork for a more equitable and resilient healthcare future.

2.1 Adaptations in Cancer Care Delivery

The COVID-19 pandemic necessitated significant adaptations in cancer care delivery to mitigate disruptions, ensure patient safety, and sustain access to essential services (Jazieh *et al*., 2002). These adaptations, while born of necessity, have highlighted innovative approaches that may shape the future of oncology care, particularly in resource-limited settings like the Global South.

Telemedicine emerged as a vital tool during the pandemic, enabling healthcare providers to maintain contact with cancer patients while minimizing the risks associated with in-person visits (Grewal *et al*., 2020). Teleconsultations were widely adopted for follow-ups, symptom management, and routine check-ins, reducing the need for patients to travel to

healthcare facilities. However, the rapid shift to telemedicine exposed significant limitations, particularly in the Global South. Many rural areas faced challenges related to digital literacy, limited internet connectivity, and the lack of access to smartphones or computers (Nayyar *et al*., 2019). These barriers excluded vulnerable populations from fully benefiting from telehealth solutions, underscoring the need for investments in digital infrastructure and targeted training programs to bridge the digital divide.

Decentralized care models gained traction during the pandemic as a means of bringing cancer care closer to patients, especially those in rural or underserved areas (Holeman and Kane, 2020). Community-based care initiatives, such as the establishment of satellite clinics, allowed patients to access diagnostics, chemotherapy, and palliative care services without traveling to urban centers. These localized facilities alleviated the burden on tertiary care hospitals and improved continuity of care. To support decentralized models, local healthcare workers were trained in cancer care delivery, including the administration of treatments and symptom management. This training enhanced the capacity of primary care providers to address the unique needs of cancer patients, fostering a more resilient and accessible healthcare system (O'Sullivan *et al*., 2020). These models also demonstrated the importance of leveraging existing community networks to deliver high-quality care in resource-constrained settings.

Fig 1: Various adaptations in cancer care delivery

The pandemic prompted oncologists to explore innovative treatment protocols that balanced efficacy with the need to reduce hospital visits and patient exposure to COVID-19 (Hwang *et al*., 2020). For instance, chemotherapy regimens were shortened or simplified, enabling patients to complete treatment cycles with fewer hospital visits. Oral chemotherapy options were also promoted when clinically appropriate, allowing patients to manage their treatment at home. Similarly, alternative radiation therapy schedules were implemented to reduce the frequency of sessions. Hypofractionated radiation therapy, which involves delivering higher doses of radiation over a shorter period, became a preferred approach in many settings (Morgan *et al*., 2018). These adjustments not only minimized patient exposure to healthcare environments but also optimized the use of limited resources, such as equipment and personnel, during the pandemic.

Collaboration between governments, non-governmental organizations (NGOs), and international organizations played a critical role in sustaining cancer care delivery during the pandemic (Jumbam *et al*., 2020). These partnerships facilitated the pooling of resources, expertise, and funding to address the unique challenges faced by oncology services. For example, NGOs and international health agencies provided financial support, equipment, and technical assistance to strengthen cancer care infrastructure in low- and middle-income countries. Funding initiatives were also launched to ensure the uninterrupted delivery of cancer treatment. Governments and private donors mobilized resources to procure essential drugs, protective equipment, and diagnostic tools (Kohler and Bowra, 202o). These efforts underscored the importance of a collective response in mitigating the impact of global health crises on vulnerable populations.

Vaccination against COVID-19 became a critical component of cancer care adaptations. Cancer patients, due to their immunosuppressed status, were prioritized for vaccination in many countries (Pittet *et al*., 2020). Early access to vaccines significantly reduced the risk of severe illness and death among this vulnerable group, allowing them to continue their treatment with greater confidence. Healthcare workers in oncology settings were also prioritized for vaccination to minimize transmission risks and ensure the safety of patients and staff. Infection prevention protocols were enhanced in treatment centers to create safer environments for cancer care. Measures such as routine screening for COVID-19 symptoms, mandatory use of personal protective equipment, and strict sanitization protocols were implemented. Physical distancing measures were also enforced, with waiting areas redesigned to minimize patient contact (Lal *et al*., 2020). These measures helped restore patient trust in healthcare facilities, encouraging them to resume treatments that may have been delayed.

The adaptations made in cancer care delivery during the COVID-19 pandemic illustrate the resilience and ingenuity of healthcare systems in responding to unprecedented challenges. Telemedicine integration, decentralized care models, innovative treatment protocols, resource mobilization, and enhanced infection control measures collectively enabled the continuity of cancer care despite significant disruptions (Nicholson *et al*., 2018' Ramachandran *et al*., 2019). While these adaptations were driven by necessity, they offer valuable lessons for improving cancer care delivery in the Global South and beyond. The integration of technology, community-based approaches, and global partnerships has the potential to address longstanding inequities in access and quality of care. Moving forward, healthcare systems must prioritize the institutionalization of these innovations to build resilience against future crises and improve outcomes for cancer patients worldwide.

2.2 Challenges in Cancer Care Management

The COVID-19 pandemic has posed profound challenges to cancer care management, disrupting services and exacerbating inequities in access (Rodin *et al*., 2020). These disruptions have significantly impacted diagnosis, treatment, and the overall well-being of cancer patients, particularly in resource-limited settings such as the Global South. Below, we explore the key challenges in managing cancer care during the pandemic.

The pandemic caused significant disruptions in cancer services globally. With healthcare systems overwhelmed by COVID-19 cases, many cancer patients experienced delays in diagnosis and treatment. Restricted access to healthcare facilities due to lockdowns and fear of virus exposure prevented patients from seeking timely medical attention (Dubey *et al*., 2020). As a result, many cancers went undiagnosed or were diagnosed at more advanced stages, reducing the likelihood of successful treatment. Treatment delays became a critical issue as elective surgeries, chemotherapy sessions, and radiation therapy appointments were postponed to prioritize COVID-19 patients. In many

regions, cancer surgeries deemed non-urgent were indefinitely delayed, leading to disease progression in affected individuals. Additionally, logistical challenges in transporting medical supplies and patients further exacerbated delays, creating backlogs that strained healthcare systems long after initial disruptions.

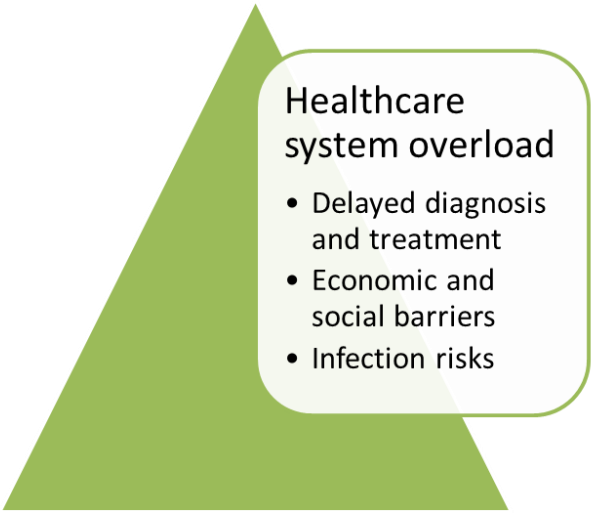

Fig 2: Challenges in cancer care management

The pandemic caused a massive reallocation of healthcare resources, diverting personnel, equipment, and funding away from oncology services to manage the surge in COVID-19 cases. In many hospitals, oncology wards were converted into COVID-19 treatment units, reducing the availability of dedicated spaces for cancer care. Healthcare personnel, including oncologists and nurses, were reassigned to COVID-19 response teams, leading to staffing shortages in cancer care (Challinor *et al*., 2020). Shortages of essential drugs and medical equipment also emerged as supply chains were disrupted. For example, limited availability of chemotherapy drugs and personal protective equipment (PPE) hindered the delivery of routine cancer treatments. Diagnostic tools such as imaging equipment became less accessible as they were redirected for COVID-19 diagnosis and monitoring. These resource constraints disproportionately impacted low- and middle-income countries (LMICs), where healthcare infrastructure was already stretched thin.

Cancer patients were particularly vulnerable during the pandemic due to their immunosuppressed state, which results from both the disease and its treatments, such as chemotherapy and radiation therapy (Mohammed *et al*., 2020). This vulnerability placed them at an increased risk of severe COVID-19 infection and complications. Many cancer patients who contracted COVID-19 experienced higher hospitalization and mortality rates compared to the general population. The heightened vulnerability of cancer patients also posed challenges for healthcare providers, who needed to balance the risks of delaying treatment with the potential for COVID-19 exposure during hospital visits. Strict infection control protocols, while necessary, created additional logistical hurdles and extended treatment timelines (Isidori *et al*., 2020). For example, routine follow-ups were often deferred, and in-person consultations were replaced with telemedicine solutions, which were not always accessible to all patients.

Financial challenges significantly affected cancer care during the pandemic, particularly in LMICs. The increased use of PPE, alongside other infection control measures, added to the cost of delivering cancer treatment. Additionally, disruptions in global supply chains drove up the prices of essential cancer drugs and medical supplies, making treatments less affordable for healthcare systems and patients alike (Sharma *et al*., 2019). Economic downturns caused by the pandemic further reduced the ability of individuals and governments to finance cancer care. Job losses and declining household incomes left many patients unable to afford the high costs of treatment, leading to increased rates of treatment discontinuation. In LMICs, where out-of-pocket payments are a significant source of healthcare financing, the financial burden on cancer patients was particularly severe.

The pandemic exposed and widened existing inequities in access to cancer care. Urban-rural disparities became more pronounced as rural populations struggled with limited healthcare infrastructure and fewer oncology specialists. Many rural patients faced logistical challenges in traveling to urban centers for treatment due to movement restrictions and high transportation costs (Onyeme *et al*., 2019). Social determinants of health, including poverty, education, and geographic location, further exacerbated disparities in cancer care. Marginalized communities, including low-income groups and ethnic minorities, were disproportionately affected by disruptions in care. The lack of digital infrastructure in many parts of the Global South also limited access to telemedicine solutions, which emerged as a critical tool for maintaining continuity of care during the pandemic.

The challenges faced in cancer care management during the COVID-19 pandemic underscore the vulnerabilities of healthcare systems, particularly in resource-constrained settings. Disruptions in diagnosis and treatment, resource allocation issues, the vulnerability of cancer patients to COVID-19, financial constraints, and inequities in access collectively highlight the need for more resilient healthcare systems (Benfer *et al*., 2019). Addressing these challenges requires targeted strategies, including resource optimization, equitable healthcare delivery, and financial support for vulnerable populations. By learning from these experiences, healthcare systems can better prepare for future crises, ensuring that cancer patients receive uninterrupted, high-quality care (Cancino *et al*., 2020).

2.3 Case Studies and Examples

The COVID-19 pandemic profoundly disrupted healthcare systems worldwide, especially in cancer care, which saw delays in diagnosis and treatment. Despite these challenges, several countries in the Global South demonstrated resilience through innovative adaptations (MacAlister and Subramanyam, 2018). The following case studies highlight successful examples of how these countries navigated the pandemic and the lessons learned from their approaches.

Kenya's healthcare system faced significant challenges during the pandemic, including resource constraints and limited access to specialized oncology services in rural areas. To address these issues, the Kenyan Ministry of Health and local organizations implemented decentralized cancer care models. Satellite clinics and community-based programs were established to bring care closer to patients in underserved regions. One example was the expansion of cancer treatment services at the Kenyatta National Hospital (KNH) satellite clinics. These clinics provided chemotherapy and follow-up consultations, reducing the burden on central facilities and minimizing patient travel. Additionally, healthcare workers in rural areas received training in cancer management, enabling them to offer essential services. The Kenyan experience underscores the importance of decentralizing care and leveraging community health

networks to improve accessibility, especially in resource-limited settings (Geldin, 2019).

India's vast population and high cancer burden presented significant challenges during the pandemic. The rapid adoption of telemedicine was a critical adaptation to maintain continuity of care. The Tata Memorial Centre (TMC), a leading cancer institute, implemented teleconsultation services for follow-ups, symptom management, and psychosocial support. The use of digital platforms allowed oncologists to remotely manage patients, especially those unable to visit hospitals due to travel restrictions. Patients received guidance on oral chemotherapy regimens and symptom monitoring, reducing the need for in-person visits. TMC also partnered with local pharmacies to ensure the timely delivery of medications. India's success in implementing telemedicine highlights the potential of digital health solutions in overcoming barriers to cancer care (Chandwani *et al*., 2018). However, challenges such as digital literacy and access to internet services in rural areas remain critical areas for improvement.

Brazil faced significant disruptions in oncology services due to the overwhelming demand on healthcare resources during the pandemic. To address these challenges, Brazilian oncology centers adopted innovative treatment protocols to ensure the continuity of care. Institutions such as the Barretos Cancer Hospital implemented hypofractionated radiation therapy, delivering higher doses of radiation over fewer sessions. This approach reduced the number of hospital visits for patients, minimizing their exposure to COVID-19 and optimizing resource utilization. Additionally, oral chemotherapy options were prioritized to allow patients to continue treatment at home (Krikorian *et al*., 2019). The Brazilian experience demonstrates the value of flexible and patient-centered treatment approaches in maintaining care delivery during crises.

The case studies of Kenya, India, and Brazil reveal several important lessons for improving cancer care in the Global South. Community-based care models effectively address geographical barriers, particularly in rural and underserved areas. By leveraging local healthcare networks, countries can enhance accessibility and reduce patient travel burdens. Telemedicine and other digital health innovations are vital tools for maintaining continuity of care (Khera *et al*., 2020). However, ensuring equitable access to technology and addressing digital literacy gaps are critical for maximizing their impact. Flexible approaches to treatment, such as hypofractionated radiation therapy and oral chemotherapy, enable healthcare systems to sustain care delivery during emergencies. Partnerships between governments, healthcare institutions, and international organizations facilitate resource mobilization and capacity building, ensuring the resilience of cancer care systems (Kandel *et al*., 2020). The adaptations seen in Kenya, India, and Brazil demonstrate the resilience and ingenuity of healthcare systems in addressing the challenges posed by the COVID-19 pandemic. These countries' experiences underscore the importance of decentralization, digital health, adaptable treatment protocols, and collaborative efforts in sustaining cancer care delivery in resource-limited settings. Moving forward, the lessons learned from these case studies can serve as a foundation for building more resilient and equitable cancer care systems in the global south and beyond (Gostin and Friedman, 2019). By institutionalizing these innovations, healthcare systems can improve outcomes for cancer patients, even in the face of future crises.

2.4 Future Directions

The COVID-19 pandemic exposed critical vulnerabilities in cancer care systems globally, especially in resource-limited settings within the global south (Nouvet *et al*.., 2020). While innovative adaptations were implemented to mitigate these challenges, there is an urgent need to institutionalize these measures and explore future directions to strengthen cancer care delivery. This review outlines strategies for building resilient healthcare systems, addressing inequities in cancer care, and preparing for future crises.

A key lesson from the pandemic is the importance of resilient healthcare systems capable of sustaining essential services during crises. Investment in oncology-specific infrastructure, such as cancer treatment centers, diagnostic laboratories, and equipment, is critical. In many Global South countries, the limited number of comprehensive cancer centers results in overcrowding and delays (Gunasekera *et al*., 2018). Expanding the availability of regional and community-based facilities can reduce the burden on centralized institutions. Additionally, training and retaining an adequate workforce of oncologists, nurses, and support staff is essential to meet growing demand. Governments and healthcare organizations must prioritize capacity-building initiatives to develop skilled professionals, particularly in underserved areas. Telehealth has emerged as a transformative tool for cancer care, enabling remote consultations, symptom monitoring, and follow-ups. Future efforts should focus on scaling telehealth services to reach remote and rural communities where access to oncology care remains limited. Investments in digital infrastructure, such as reliable internet connectivity and user-friendly platforms, are necessary to address existing gaps. Moreover, governments and organizations must invest in digital literacy programs to empower patients and healthcare workers to effectively utilize telehealth technologies (Ortega *et al*., 2020).

Cancer care in the Global South is marked by significant disparities in access and affordability, exacerbated by socioeconomic and geographical factors. Decentralized care models can play a pivotal role in reducing urban-rural disparities (Li *et al*., 2018). Establishing satellite clinics, mobile diagnostic units, and community-based programs ensures that patients in rural areas receive timely care. These models can be further enhanced by training community healthcare workers in oncology support, fostering a localized approach to cancer care. The economic impact of cancer care is a significant barrier for many patients in the global south, especially in low-income households. Governments and international organizations must prioritize funding initiatives to subsidize the cost of treatment, including chemotherapy, radiation therapy, and medications. Partnerships with pharmaceutical companies to develop affordable pricing models and initiatives to reduce the cost of essential drugs are also critical. Innovative financing mechanisms, such as cancer care insurance programs, can further alleviate financial burdens on patients (Carrera *et al*., 2018).

The pandemic underscored the need for healthcare systems to develop adaptive strategies for sustaining cancer care during emergencies (Mallhi *et al*., 2020). Flexibility in treatment protocols is essential to ensure continuity of care during crises. For instance, the use of hypofractionated radiation therapy, simplified chemotherapy regimens, and oral medications during the COVID-19 pandemic reduced hospital visits and minimized disruptions. Future protocols should institutionalize these approaches to provide adaptable and patient-centered care during emergencies. Preparedness for future pandemics or other large-scale disruptions requires coordinated efforts at multiple levels. Governments, healthcare institutions, and international organizations should

develop contingency plans to ensure that oncology services are not sidelined. This includes stockpiling essential drugs, maintaining adequate inventories of personal protective equipment (PPE), and ensuring the availability of backup resources for diagnostic and treatment facilities. Strengthening global cooperation to share resources and expertise during crises is also critical. Building resilient healthcare systems, addressing inequities, and preparing for future crises are essential steps to improve cancer care in the Global South (Barach *et al*., 2020). By strengthening oncology infrastructure and workforce, expanding telehealth solutions, reducing urban-rural disparities, and developing adaptable treatment protocols, healthcare systems can better meet the needs of cancer patients, even in the face of emergencies (Cyr *et al*., 2019; LeBlanc *et al*., 2020). These efforts require collaboration between governments, healthcare institutions, and international organizations to ensure sustainable and equitable cancer care delivery. Institutionalizing the lessons learned during the COVID-19 pandemic can serve as a foundation for creating a more robust and inclusive approach to oncology in the Global South and beyond. Through these future directions, the global community can work toward achieving better outcomes and improving the quality of life for cancer patients worldwide (Smith *et al*., 2020).

Conclusion

The COVID-19 pandemic profoundly disrupted cancer care worldwide, with the Global South facing unique challenges due to pre-existing healthcare inequities and limited resources. Delays in diagnosis, postponement of treatments, and resource allocation issues exacerbated the vulnerability of cancer patients, many of whom faced increased mortality risks due to compromised immunity. Furthermore, financial constraints and urban-rural disparities highlighted the urgent need for systemic reform in these regions. Despite these challenges, innovative adaptations emerged, such as telemedicine integration, decentralized care models, and simplified treatment protocols. Partnerships between governments, non-governmental organizations (NGOs), and international agencies were instrumental in mobilizing resources, developing new strategies, and ensuring continuity of care in resource-limited settings.

However, the pandemic has underscored the pressing need for sustained innovation and investment in cancer care infrastructure. Strengthening oncology services, expanding telehealth capabilities, and training local healthcare workers are critical to improving access to timely and equitable cancer care. Additionally, reducing financial and geographical barriers is essential to address the persistent disparities in care delivery. As the Global South continues to face the dual burden of infectious and non-communicable diseases, prioritizing cancer care will be key to achieving long-term health equity and resilience.

Governments, healthcare providers, and international organizations must act decisively to institutionalize the lessons learned during the pandemic. By fostering collaborations, allocating resources efficiently, and promoting research and innovation, these stakeholders can build robust and inclusive cancer care systems that address the unique needs of resource-limited settings. This collective effort is essential not only for overcoming current challenges but also for preparing healthcare systems to better respond to future crises, ensuring improved outcomes for cancer patients worldwide.

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