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RESEARCH ARTICLE

AN OVERVIEW OF THE PRESENT STATE OF CANCER DIAGNOSIS AND MANAGEMENT IN SUB-SAHARAN AFRICA

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Abstract

Background: Cancer presents a growing public health crisis in sub-Saharan Africa (SSA), marked by increasing incidence and significantly higher mortality rates than those seen in high-income countries.

Objective: This review aims to evaluate the current state of cancer diagnosis and management in SSA, synthesising evidence from the past decade.

Methods: A comprehensive literature review was conducted, focusing on studies, reports, and data from the SSA published within the last ten years, with particular attention to diagnostic access, treatment availability, health system capacity, and policy responses.

Results: Major diagnostic challenges include restricted access to imaging and pathology services, late-stage presentation, and a critical shortage of trained personnel. Treatment delivery comprising surgery, radiotherapy, chemotherapy, and targeted therapies is hindered by infrastructural deficits, lack of essential equipment, high drug costs, and workforce inadequacies. Broader health system limitations, such as fragmented care pathways, financial barriers, and weak cancer registries, further compound the burden. Nonetheless, recent efforts, including national cancer control plans, international collaborations, and innovations such as tele-oncology, indicate incremental progress.

Conclusion: There is an urgent need for substantial and sustained investment in cancer infrastructure, workforce development, data systems, and regional integration. Addressing these gaps requires equitable, context-specific strategies aligned with universal health coverage to mitigate the growing cancer burden across SSA.

Introduction:-

The global burden of cancer is rising, with low- and middle-income countries (LMICs), particularly in SSA, bearing an increasing share[1]. While cancer incidence in SSA is currently lower than in high-income regions, mortality rates are significantly higher, reflecting profound disparities in access to timely diagnosis and effective treatment[2,3]. Projections indicate a near doubling of cancer incidence in Africa by 2040, driven by demographic changes,

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urbanisation, and lifestyle shifts[4]. The rising burden threatens fragile health systems already strained by infectious diseases. Effective cancer diagnosis and management are paramount for improving survival and quality of life.

The objective of this review is to provide a comprehensive overview of the current state of cancer care in SSA, focusing on epidemiology, diagnostic and therapeutic capabilities, systemic challenges, ongoing initiatives, research gaps, and future directions, with a focus on evidence from the past decade.

Epidemiological Overview:

Cancer incidence and mortality in SSA exhibit distinct patterns. Common cancers include infection-associated malignancies like cervical (caused by HPV), liver (associated with HBV/HCV), and Kaposi sarcoma (HHV-8), alongside breast and prostate cancers[5,6]. Age-standardised incidence rates (ASIRs) for cervical cancer in SSA are among the highest globally, while prostate cancer incidence and mortality are rising rapidly[7.8]. Breast cancer, often presenting at younger ages and more advanced stages than in high-income countries, is a leading cause of cancer death among women [9]. Significant regional disparities exist; East Africa has high rates of Oesophageal cancer, while Southern Africa reports higher rates of lung and colorectal cancers[10,11]. Late-stage diagnosis is pervasive, contributing to mortality rates often exceeding 70% for many common cancers, compared to less than 50% in high-resource settings[11,12]. Cancer registries, essential for planning, remain sparse and under-resourced, leading to significant underestimation of the true burde

Current Diagnostic Landscape

Diagnostic Modalities: Access to essential diagnostic tools is severely limited. Basic imaging (X-ray, ultrasound) is more available, but access to computed tomography (CT) is restricted, and magnetic resonance imaging (MRI) and positron emission tomography (PET) are scarce outside major referral centres [15,16]. Histopathology services are centralised in urban areas; immunohistochemistry (IHC), crucial for subtype classification (e.g., breast cancer), is often unavailable or unreliable[17]. Tumour marker testing (e.g., PSA, CA-125) is inconsistently accessible. Molecular diagnostics (PCR, next-generation sequencing - NGS) and liquid biopsies remain largely confined to research settings or a few specialised laboratories due to cost, infrastructure requirements, and lack of expertise[18,19].

Access and Utilisation: A stark urban-rural divide exists. Rural populations face immense barriers, including distance to facilities, transportation costs, and lack of awareness [20]. Delayed presentation is a critical issue, driven by low health literacy, cultural beliefs, fear, stigma, and reliance on traditional medicine[21]. Consequently, 60-80% of patients present with advanced (Stage III/IV) disease [22]. Cost remains a prohibitive factor for many diagnostics, compounded by insufficient infrastructure (reliable electricity, water) and critical shortages of trained personnel (pathologists, radiologists, radiographers, laboratory technicians)[23,24].

Cancer Treatment Modalities

Surgery: Surgical oncology services are concentrated in tertiary centres. While essential for solid tumours, access is limited by shortages of trained surgical oncologists, anesthesiologists, operating theatre capacity, inadequate postoperative care, and blood bank deficiencies [25,26]. Safety and quality standards vary considerably.

Radiotherapy: Radiotherapy, required for approximately 50% of cancer patients, is severely under-resourced. Many SSA countries lack any radiotherapy facilities; the region has less than 10% of the needed machines[27,28]. Existing centres face chronic challenges: machine breakdowns due to ageing equipment, lack of maintenance engineers, power fluctuations, shortages of radioisotopes, and insufficient medical physicists and radiation therapists[29,30]. This results in long waiting times and compromised treatment schedules.

Chemotherapy:Access to essential cytotoxic drugs is inconsistent. Affordability is a major barrier, exacerbated by importation costs, taxes, and mark-ups[31]. Supply chain weaknesses lead to stockouts, while concerns about drug quality and counterfeit products persist[32]. Supportive care drugs (e.g., anti-emetics, growth factors) are often unavailable or unaffordable[33].

Targeted and Immunotherapies:Access to targeted therapies (e.g., trastuzumab for HER2+ breast cancer) and immunotherapies is extremely rare outside of private practice or specific research/compassionate use programs due to exorbitant costs (often exceeding annual incomes) and infrastructure demands for administration and monitoring[34,35]. Participation in global clinical trials offering newer agents is limited[36].

Palliative Care:Integration of palliative care into national health systems is inadequate. Access to oral morphine and other essential pain relief medications is severely restricted by regulatory barriers, inadequate training, and misconceptions about opioid use[37, 38]. Holistic end-of-life care services are scarce, especially outside major cities[39].

Health System Challenges:

The delivery of cancer care by SSA nations is hindered by inherent shortcomings within the health system.

- Labour Deficiencies: Severe shortage of qualified oncology professionals, including medical, clinical, and radiation oncologists, pathologists, radiologists, oncology nurses, chemists, and allied health personnel. The emigration of skilled individuals to high-income nations exacerbates capacity depletion [40,41].
- Insufficient infrastructure: Insufficient facilities, inconsistent power and water supply, inadequate sanitation, and limited maintenance capabilities hinder service delivery [42].
- Fragmented referral pathways result in unclear, ineffective systems that cause delays, duplication, and patient loss to follow-up[43].
- Financial obstacles: Significant out-of-pocket costs for diagnosis and treatment are disastrous for numerous families. The absence of universal health coverage (UHC) or insufficient integration of cancer services into health insurance plans constitutes a significant barrier [44,45].
- Inadequate Data Systems: Population-based cancer registries encompass only a limited segment of the population. The absence of comprehensive data impedes planning, resource distribution, and progress assessment [46,47].

Ongoing Initiatives and Innovations

Efforts are underway to address the cancer burden:

- National Cancer Control Programs (NCCPs): Numerous SSA nations have formulated NCCPs; nevertheless, execution and financing continue to pose significant obstacles [48].
- Public-Private Partnerships (PPPs) & International Support:Partnerships with NGOs (e.g., African Organisation for Research and Training in Cancer - AORTIC), international agencies (WHO, IAEA Programmed of Action for Cancer Therapy - PACT, Union for International Cancer Control - UICC), and private entities aim to build capacity, provide equipment, and support training[49,50].
- The IAEA has been instrumental in supporting radiotherapy centres[51].
- Innovations: Mobile health units for screening,such as cervical cancer using VIA, telepathology/tele-radiology consultations, and tele-oncology for specialist advice, are being piloted to bridge geographic gaps[52,53].
- Centres of Excellence: Establishment of regional centres (e.g., Butaro Cancer Centre in Rwanda, Uganda Cancer Institute, Inkosi Albert Luthuli Central Hospital in South Africa) aims to provide comprehensive care and training hubs[54,55].

Research Gaps and Future Directions

Significant research gaps hinder progress:

Local Data: Need for high-quality, population-specific epidemiological, genomic, and clinical outcomes data to inform tailored interventions[56].

Implementation Research findings: Research on effective models for delivering affordable, scalable cancer care in resource-constrained settings is crucial[57].

Capacity Building: Investment in training African cancer researchers and strengthening local research institutions is essential[58].

Clinical Trials Inclusion: Strategies to increase SSA participation in global clinical trials, ensuring relevance of new therapies to the regional context[59].

Prevention and Early Detection: Prioritising research and implementation of cost-effective prevention (vaccination - HPV, HBV) and early detection strategies (e.g., screening for cervical, breast, colorectal cancers)[60,61].

Survivorship: Understanding and addressing the unique needs of cancer survivors in SSA is an emerging priority[62].

Recommendations:-

Addressing the cancer crisis in SSA requires multi-faceted, sustained action:

1. Strengthen Data Systems- Investment in and expansion of high-quality, population-based cancer registries for accurate burden estimation and monitoring[63].

2.Expand Access to Diagnostics: Scale up essential diagnostics (ultrasound, basic pathology, strategically placed CT) through innovative financing, task-shifting, and public-private partnerships. Prioritise reliable supply chains for reagents and consumables[64].

3. Improve Treatment Access:Increase radiotherapy capacity through strategic planning, sustainable financing, and international support (e.g., IAEA). Ensure a reliable supply and affordability of essential chemotherapy drugs. Explore mechanisms for sustainable access to select targeted therapies where clinically impactful [65,66].

4. Build and Retain Workforce: Substantially increase investment in training oncologists, pathologists, radiologists, oncology nurses, and allied health professionals. Implement strategies for retention, including competitive remuneration and career development opportunities. Utilise task-shifting/sharing where appropriate and safe[67,68].

5.Enhance Palliative Care: Integrate palliative care into national health policies and NCCPs. Remove regulatory barriers to opioid access and train healthcare workers in pain management and palliative care[69].

6. Foster Regional Collaboration: Promote knowledge sharing, resource pooling (e.g., specialist training, rare diagnostic tests), and harmonised policies across SSA countries. Strengthen regional bodies like AORTIC[70].

7. Integrate Cancer into UHC and SDGs: Prioritise inclusion of essential cancer prevention, diagnosis, treatment, and palliative care services within national UHC benefit packages, aligned with Sustainable Development Goal (SDG) 3.4 on reducing premature NCD mortality[71,72].

8. Prioritise Prevention and Early Detection: Scale up HPV and HBV vaccination. Implement and evaluate context-appropriate, cost-effective screening programs for cervical, breast, and other high-burden cancers. Invest in public awareness campaigns[73,74].

Conclusion:-

The state of cancer diagnosis and management in sub-Saharan Africa remains characterised by significant challenges that contribute to disproportionately high mortality rates. While the burden is rising rapidly, health systems are ill-equipped to respond effectively due to pervasive gaps in infrastructure, workforce, essential medicines and technologies, and financing. Late-stage presentation is the norm, and access to comprehensive treatment, particularly radiotherapy and newer therapies, is severely limited. However, the past decade has also seen increased recognition of the crisis, the development of NCCPs, promising innovations, and strengthened international collaboration. Addressing the cancer challenge in SSA demands urgent, substantial, and sustained investment, underpinned by a commitment to equity. Success will require Africa-led, context-specific strategies, robust health system strengthening, expansion of the oncology workforce, functional cancer registries, and the integration of essential cancer services within UHC frameworks. The time for decisive action is now to avert a catastrophic human and economic cost and ensure equitable cancer care for all Africans.

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