Achieving Value in Cancer Care—the Case of Low- and Middle-Income Countries

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By the year 2030, the number of new cancer cases worldwide is projected to rise to 21.3 million annually, up from the estimated 12.7 million cancer cases currently diagnosed.[1] Of the 21.3 million new cases every year, approximately 70% will be from low- and middle-income countries (LMICs), many of which lack the healthcare programs required to effectively manage their current cancer burden, much less that predicted for 2030.[2,3] Moreover, the ratio of mortality to incidence will continue to be significantly higher in LMICs (64% to 75%) than in high-income countries (46%).[4]

A significant feature of the demographic transition in LMIC countries is the change in disease epidemiology; the result is a dual burden of cancer in the presence of communicable and noncommunicable diseases.[5] A consequence of infectious diseases as well as westernized lifestyles, this "cancer transition" has contributed to a higher average burden of cancer (in terms of disability-adjusted life-years [DALYs] lost) in these low-resource settings compared with high-resource regions.[2] This is largely due to premature mortality (years of life lost), which stems from advanced disease at presentation and variable access to cancer care.[6,7]

Improvements in prevention, screening, early diagnosis, and treatment have led to reductions in mortality from cancer in high-income countries, following significant economic investment. However, many countries have reached a plateau, with increased financial investment no longer an assurance of improved outcomes.[8,9]

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In LMICs, the costs of managing such chronic health issues and their risk factors are stretching the already fragile health services infrastructure, or, in many cases, generating a catastrophic impact on health costs and personal finances.[10,11] Many health programs focus solely on communicable diseases through vertical interventions, with little strategic planning for chronic diseases. Cancer treatment in particular is highly challenging and quite distinct from all other service provision planning. The lack of coordination between the plethora of public and private institutions, as well as uncontrolled private enterprise, has contributed to wastage of healthcare resources, gaps in coverage, and wide variations in quality as a result of varying modalities of financing, affiliation, and healthcare delivery.[12]

How Can We Achieve Value in the Management of Cancer?

Research

Despite the burden of cancer in LMICs, only a fraction (2.7%) of global sector investment in cancer research is spent on R&D directly relevant to LMICs.[13] Research efforts should be focused to meet the unique challenges of cancer care in LMICs and should enable cost-effective treatment pathways with highly significant outcomes.[14] This is not just about creativity—rather, greater emphasis must be placed on achieving equivalent or superior outcomes using prevailing treatments and technology, intermittently or for shorter duration. This will include practices of care that encourage shorter in-patient stays and less extensive use of expensive cancer medicines. LMIC countries need to be encouraged to choose a leadership role in value-based research, but currently, the economic incentives for this are limited, especially where fee-for-service financing of healthcare predominates. With regard to radiation technologies, brachytherapy, hypofractionated radiotherapy (reduced number of treatment sessions whilst maintaining effective dose), and combination therapy (with chemotherapy agents) provide potentially cost-effective options for radical treatment and palliation.[15-17]

Prevention

LMICs cannot sustain pursuing a high-income –country model of cancer management. Their priority should instead be prevention and adequate financing of public systems. Public health campaigns need to focus on prevalent risk factors such as obesity, sedentary lifestyles, and smoking. Taxation has been advocated as an integral component of antitobacco policy,[18] and food advertising regulation, school-based educational initiatives, and pricing policies on foods have all been considered as ways to tackle obesity.[19]

Infectious agents such as *Helicobacter pylori,* human papilloma virus, and hepatitis B virus are mediators of gastric cancer, cervical cancer, and hepatocellular carcinoma, respectively.[20] These cancers require multimodality management, including radiotherapy, surgery, and chemotherapy. Although expensive, the diseases are potentially preventable through modulation of the causative agent. Vaccinations have been developed for the human papilloma virus, which can significantly reduce the risk of developing a malignancy,[21] and are being rolled out in LMICs such as Rwanda.[22] However, primary prevention with vaccination or screening programs will not necessarily be cost-effective in all countries. Instead, programs such as visual inspection with acetic acid for cervical cancer can prove cost-effective in the diagnosis of early-stage cancers.[23]

Funding of Healthcare

The structure of the healthcare system will have a direct impact on the ability of individuals and their families to access healthcare, and can potentially widen inequities in outcomes. Inability to pay for specialist diagnostic and treatment services can result in late presentation, diagnosis, and inadequate treatment for cancer care.[24,25] It can also lead to catastrophic or impoverishing health expenditures due to a lack of financial protection afforded by the healthcare system.[26] Families may sacrifice expenditure on basic necessities such as food and housing to finance care for chronic disease. Therefore, universal healthcare coverage is essential for ensuring that vulnerable populations are protected from the financial cost of ill health, and the fee for treatment should be determined based on their ability to pay rather than the risk of ill health. However, out-of-pocket payments remain high in many LMICs.[27] Countries such as Mexico have introduced social insurance schemes to ensure risk pooling and protect from the destabilizing effects and financial implications of ill health, and Mexico is considered a model for other LMICs, especially in the face of the epidemiological transition.[28]

Avoiding the Zero-Sum Game

It is essential, given the competing healthcare demands resulting from the epidemiological transition in LMICs, to avoid a zero-sum game (where the loss equals the gain). Management of communicable diseases such as HIV/AIDS and malaria have focused on vertical interventions.[29-31] However, research into biomedical and behavioral interventions show that no single strategy is effective and that what is required is a compre-

hensive, multilevel, intersectoral, and culturally sensitive series of interventions that engages both the general population and groups at elevated risk.[32]

Interventions acting on structural factors would provide a horizontal integrated approach. If coordinated effectively and focused on issues such as education, employment, poverty, and healthcare access, these interventions could reduce the incidence and facilitate the effective management of cancer as well as reduce the incidence of other debilitating diseases, contributing to an improvement in overall population health and the achievement of Millennium Development Goals.[13,33,34]

The Institute of Medicine states, "Cancer is such a prevalent set of conditions and so costly, it magnifies what we know to be true about the totality of the healthcare system. It exposes all of its strengths and weaknesses."[35] While this is true, a horizontal approach takes into account the social determinants of health, which has roots in the economic, political, legal, and cultural environment of a country.[36,37] The impact of these factors in predisposing populations to risk of disease and outcomes from cancer care is as important as the strengthening of health services.

Manpower

Manpower shortages result in long waiting times, inequities in access, and elevated healthcare costs.[4,38] The western model has largely focused on oncologists being split into 2 categories: medical oncologists, responsible for delivery of systemic anticancer therapies, and radiation oncologists, who deliver radiation therapies, including brachytherapy. Given the shortage of specialty oncologists in LMICs, greater consideration should be given to clinical oncology specialization in LMICs to address these shortages. Clinical oncologists are trained to deliver both systemic and radiation therapies. This is particularly relevant in LMICs, where the disease burden with higher rates of cervical, oesophageal, and prostate cancer necessitates multimodality treatment.[39-41] A dual-training approach provides a flexible workforce, reduces the number of consultations an individual requires, and potentially ensures greater efficiency in resource consumption. There is also an urgent need to address the chronic shortage and up-skilling of surgeons to tackle cancer.[42,43] In many LMICs, cancer specialization will not be cost-effective and new general cancer surgical training models will need to be implemented.

Conclusion

To conclude, value-based strategies are essential in LMICs to develop efficient, sustainable cancer care programs to meet the projected rise in cancer incidence. A high-income country model is not feasible or appropriate in LMICs. However, through an appreciation of the structural factors which predispose and potentiate cancer—as well as affect access, quality, and affordability of cancer care—high-value, cost-effective strategies can be developed. Critically, most LMICs do not have sufficient funds allocated to develop basic cancer care systems or to develop and implement models that would avoid high patient expenditures. Additionally, LMICs should assign funds to adequately compensate cancer healthcare professionals in the public sector. **EBO**

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