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Cost Effectiveness of Cancer Therapies in Africa

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Developed countries spend a fortune on health care compared to developing countries. However, concerns have recently been raised about the ever increasing cost of cancer care even in the most affluent countries in the world [1].

Cancer therapy is one of the most expensive aspects of health care as it embraces screening, diagnosis, treatment, surveillance and palliative measures. Screening involves the use of evidence based methods to detect early cancers. Diagnostic methods have evolved into very complex radiological, nuclear and molecular testing. Treatment comprises special and complicated surgeries, chemotherapy and targeted therapies as well as radiation therapy at the initial stages of diagnosis or as palliative options. Surveillance includes schedules doctor visits with associated blood test, numerous radiological and nuclear imaging. Palliative care involves not only the use of pain medication but may involve any of the above interventions that may improve quality of life.

New medical interventions such as imaging, Intensity Modulated Radiotherapy, Cone beam radiotherapy improve health outcomes but at relatively high cost. The economic impact of cancer care is now a reality and is expected to continue to raise causing concern across all countries wealthy or poor [1].

Unlike most countries that share the cost between government and insurance partners, in Africa, most patients and their families have to bear the cost of treatment from already meager resources [2]. This can be attributed to the low percentage of resources allocated health budgets and the fact that cancer control is the least amongst the priority list competing with communicable diseases.

But then, due to the devastating nature of cancer, any expenditure that may improve survival and decrease suffering is mostly considered appropriate by society without analyzing the economic impact and absolute benefit.

There are various components of health economic evaluations that compare alternatives of treatment to standard choices. Of course, there are various limitations in applying economic analysis to oncology e.g. is it worth spending tens of thousands of dollars per patient for a three month increase in survival, not to talk about the cost of managing the associated toxicities arising from these therapies? [3].

The universal declaration of Human rights Article states that everyone has a right to share on scientific advances[4] and its benefits but how do we do that if it cost us too much? [4].

How do we appropriately allocate our meager state health resources to reduce suffering from cancer especially with the looming cancer burden that is expected to befall developing countries within the next decade?

Below is a table to analyze the economic concepts of health expenditure [3].

Economic Concepts of Health

Direct Medical Cost - Medications, Investigations, Therapies

Non-Medical cost -Transport, Feeding, and Assistance in daily living

Other cost-Pain and suffering, lost productivity and intimacy in personal relations.

WHO commission on macro-economic and health recommendations that medical interventions which yield a year of life saved is cost effective if the price is less than the average per capita annual domestic product for that country [5].

Less than 1x GDP - Very effective

1-3x GDP - Effective

More than 3x GDP - Ineffective

Medical intervention that is Cost effective in United States may not be in Africa due to our relatively low GDP.

Cost effectiveness is also a method for evaluating the outcomes and cost of interventions designed to improve health i.e. survival, response rates

Incremental cost effectiveness ratio is the additional cost for obtaining one additional unit of outcome i.e. 1 month increase in survival or additional year of life but does not quantify the effect on quality of life from this new treatment .A strategy may appear superior in terms of cost effectiveness but may have lower absolute effectiveness [3].

We also have to consider patient preferences which are measured as quality adjusted life years (QALYS) [6].

Cancer patients are being taxed by high technology based treatments and expensive drugs without us considering the economic burden on patients and their families. What we all forget is the indirect cost (out of pocket expenditure) which have resulted in individual and family bankruptcy declarations even in rich countries [7,8].

In reference to chemotherapy, the cost of new and presumably more effective drug therapies is prohibitive in low resource setting. We end up with generics and only God knows what we are using! [9].

Targeted therapies are very costly due to the high cost of research and drug developments which need to be recuperated understandably. Measures include test to determine who may benefit or have increased toxicity from these drugs with the aim of eventually saving cost e.g. hormone receptor status and her 2 new testing in breast cancer, kras mutations for colorectal cancer , ALK receptor testing for lung cancer

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, c Kit in sarcomas, just to mention a few [10]. The costs of these preliminary tests are unaffordable to the out of pocket paying individual in low income countries.

Supportive care interventions such as the use of platelets/granulocyte stimulating growth factors and others, as well as newly developed effective therapies for management of mucositis and emesis during chemotherapy administration are also added cost.

We should remember that indirect cost may lead to noncompliance and finally poor outcomes. Radiotherapy in Africa has been extensively supported by the International Atomic Energy Agency. Vienna, Austria. Radiation therapy is one of the cost effective cancer therapies and is of high priority in any cancer control program with at least 60% of cancer patients requiring irradiation as some point during the disease process [11].

The cost effectiveness of the complexity of newer radiation delivery techniques is a different matter and has been debated by many, but unrefuted is the gain in lowering the sequelae of radiation treatments [12].

For many years African countries have relied on the outdated low cost, simple, reliable horse, the Co^{60} teletherapy machine, in spite of more technologically advanced equipment.

Many of these countries are now introducing 3Dimensional Treatment planning technologies, high energy linear accelerators and complex verification equipment irrespective of high initial installation and maintenance cost. Maintenance of expensive, temperamental equipment is an important cost consideration subject especially as most of our countries have unstable and poor electricity supply.

This advancement into more advanced radiation delivery equipment is highly recommended for early stage disease to minimize toxicity and improve dose distributions in the attainment of cure. A good portion of our patients have very advanced disease and may not require these high end technologies to improve the quality of their lives without the financial burden on patients and health budgets. In the near future, with improvement in health care delivery in our countries especially in the area of cancer control more patients will be diagnosed at curable stages of cancer.

From the personal experience of both worlds, always keep it simple. As much as we want to embrace highly technologically advanced evidence based medicine to improve cancer outcomes we have several limitations. We have not even deliberated the retention of expensively trained highly skilled medical personnel required to adequately tackle the cancer problem in our region. All the same, we regretfully are left behind in the recent improvements in cancer outcomes due to [13]

- Budgetary restrictions limiting technological advancement
- Lack of skilled staff
- Paucity of supporting systems.

The final treatment plan such as choice of drugs, surgery, radiotherapy and the sequence is derived from

- Financial state of our patient,
- Availability of therapy
- Overall impact to patient/family.

It's therefore very difficult to adhere to standard guidelines in cancer management for patients without minor or major deviations.

The cost effectiveness of each treatment option therefore may vary from patient to patient unless cost is being covered by others.

It is our responsibility in Africa as oncologist to recommend the most cost effective cancer protocols depending on our circumstances [6].

Before we embrace the acquisition and use of advanced technologies on a broad scale, we need to talk and walk cancer control strategies as priorities for our nations. That is, dwell on prevention and early detection to reduce the large number of advanced and palliative cases which may not justify the economics of the use of advanced, expensive but effective cancer therapies [13].

The more curable cancers we have, the more we can justify our government and tax payers investing in new expensive therapies for cancer care.

Conclusion

The burden of cost affecting effective cancer management could be lifted if our governments generate more interest in cancer control. With early presentations, treatments both basic and advanced become more cost effective.

The quality of palliative care in advanced cancer cannot be ignored as it is an essential component of cancer management. We need the most cost effective treatments as the final days of life are the most expensive aspect of cancer care.

At least basic but effective cancer treatments should be fully funded, basic radiation therapy and imaging/diagnostic equipment ensured to run efficiently by skilled personnel to derive the most benefit.

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