

DECENTRALIZATION OF CANCER CARE AND HOSPITAL-BASED HEALTH TECHNOLOGY ASSESSMENTS IN EGYPT



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Decentralization of cancer care in developing countries allows facilities to properly evaluate their needs, and build appropriate infrastructures according to evidence-based assessments. This is further supported by the growing concept of hospital-based health technology assessments. This article covers some aspects of decentralized infrastructure development in a single clinical oncology department in Egypt. The projects include a central chemotherapy independent unit, electronic medical records, a radiotherapy e-learning programme and radiotherapy infrastructure.

Worldwide, the estimated incidence of cancer is around 14 million new cases per year, and is expected to expand to 22 million annually within 20 years. Cancer deaths are also expected to rise within the same time. Developing countries are more affected by this increase; Africa, Asia, and Central and South America have 60% of worldwide cancer cases and 70% of cancer death. The total annual cost of cancer care reached US\$ 1.16 trillion in 2010 and is rising. This rise in economical burden is one of the most important barriers for effective management of cancer patients in developing countries (1).

Cancer is now the fourth leading cause of death in the eastern Mediterranean region (2). In this region, health-care providers face some added challenges including the limitations in resources, fluctuating levels of experience and medical skills among oncologists and the lack of integrity of health-care systems in most of these countries (3).

The progressive burden of cancer leads to an accumulating need for a more coordinated strategy to manage such an issue. In Egypt, work on a national strategy for cancer control has been initiated for a few years now. Multiple projects and entities are working on national solutions for this continuously increasing burden, starting from the national cancer registry programmes (4) to the work on improvement of the infrastructure of cancer

centres. But these projects face two major problems: the first one is the inadequacy of the methodology used and the second is the lack of technical and financial resources.

The infrastructure, the medical skills, the administrative proficiency and the needs of patients in different institutions are quite diverse mostly based on organizational affiliation and geographical distribution within the country. All this is manifested by inequity in the health-care provision and a huge variability in the quality of medical services carried out in ministry of health hospitals, university hospitals, military medical institutions, charity (NGOs) infirmaries and privately owned hospitals.

Health technology assessment (HTA), is an multi-criteria, evidence-based decision-making tool that includes (medical, social, ethical, economic and socioeconomic) implications of use of health technology (5).

The HTA process allows identification of the best practices in health care by using the best available scientific evidence which enhances safety, quality and cost savings leading to better alternatives for the decision-making. Even though technology assessment was developed to meet central policies' needs, its hospital-based variant will increase the potential of the individual hospital efficiency in order to compensate for the lack of central harmonization (6).

It should also be noted that even if HTA was used at a

national level, the conclusions and recommendations are often quite global and far from the local and precise questions of a hospital. New and relatively expensive technologies arrive mainly at university hospitals which are under immediate pressure from manufacturers, physicians and patients to adopt them. Only later do they reach the national agenda, while the assessment timeframe is often lengthy. Moreover, hospitals have a direct interest (medical, economic and organizational) to push and speed-up the process of assessment and reimbursement at the national level.

HB-HTA can allow hospital managers to respond to three different environmental "pressures"; such as improving the level of efficiency and effectiveness (micro-economic efficiency) as the key to improve the efficiency of the entire system (macro-economic efficiency), to acknowledge the progressive relevance of the "context" factor, and to spread the concept of an "evidence-based medicine culture" (6).

The technical aspect of health assessment includes the verification of the technology's ability to do what it was conceived for and to help the implementation of equipment or a device, something that is particularly relevant in a field like oncology with extensive reliance on technology in both its software and hardware forms.

The clinical aspects of health assessment include knowledge about the intrinsic benefit/risk balance and therapeutic progress (or relative effectiveness) in regard to alternatives, something at the core of oncology practice and decision-making.

The economic and social aspects of health assessment help decision-makers to allocate resources in an optimal way and the adoption and diffusion of technologies depends on the local context, on organizational, ethical, legal, "psychological" aspects, which is particularly useful in developing countries with financial and cultural constraints.

So as a result of the absence of an integrated health care system for cancer patients in Egypt, the need for hospital-based health technology assessments (HTA) has arisen as a step towards de-centralization of cancer care in Egypt.

In this article, we present a single department's experience (Ain Shams University, Clinical Oncology department) as the nucleus of an oncology hospital-based health technology assessment and the work done on infrastructure development against the challenges of a developing country. In many instances, the solutions and their financial solutions are quite simple. They are based on a large involvement from charity organizations and corporate social responsibilities. The main benefit of these resources is the applicability of decentralization when funding our projects.

The development projects are centred on the three main interests of a university hospital: research, education and clinical practice.

Central chemotherapy independent unit

Problem: Until two years ago, chemotherapy was directly prescribed by different specialized clinics in the department and referred as a written protocol to the administration office where nurses prepared and delivered the treatments. Chemotherapy toxicity evaluation and quality of life assessment data were very scarce and incomplete. Mechanisms for avoidance of medicinal errors were almost non-existent or dependent on personal effort. No statistical data on consumption, problematic differences between generic and original drugs, or costs were available.

Solution: An independent chemotherapy supervision unit was established by the start of 2014. This unit is responsible for chemotherapy prescription, preparation, administration, managing toxicities and recording all related medical and administrative data for analysis and autonomous correction and external auditing. Personnel sharing in the unit activity include consultants/specialists oncologists, clinical pharmacists, dispensing pharmacists, nurses and medical secretaries.

This was achieved via:

- standardized chemotherapy derived from evidence-based medicine and compatible with international guidelines;
- implementing job descriptions for all unit personnel;
- designating a standardized referencing and consultation process;
- developing a drug information centre;
- computerized data entry with a local network connecting the components of the unit including the patients' reviewing clinic, the dispensing pharmacy, the laminar flow room and the chemotherapy administration hall, and also double recording of all patient data on both computer and paper;
- chemotherapy preparation safe environment using laminar flow class IIB (cytotoxic safety cabinet);
- mechanically adjusted chemotherapy infusion rates for all patients;
- standardized toxicity assessments according to NCI CTCAE latest version by specialized clinical pharmacists;
- both computer-based and paper-based patient data archive;
- Recording of the trade names of all chemotherapeutics used for every cycle to evaluate different toxicity

patterns, especially with tens of generic drugs now widely available in the Egyptian market;

- ▶ treatment schedules coordinate for maximum savings;
- ▶ ability to calculate administration time, hence a better scheduling that avoids overcrowding of patients in administration rooms, for a better and more humane service;
- ▶ prevention of administrative errors by improving and standardizing information transmission from physician to clinical pharmacists to nurses;
- ▶ professional patient and paper administration flows;
- ▶ dedicated statistical data collection team;
- ▶ affiliated clinical research unit (CRU) nucleus: currently an upgrade is ongoing to reach a national and internationally accredited research unit funded by a pharmaceutical grant. The CRU even in its basic form is currently attracting multinational phase III/IV oncology clinical trials. We are aiming to increase our share of international clinical trials participation, advancing to other phases/variants of studies and to harmonizing the department with home grown research;
- ▶ the development of this unit has attracted many fresh graduate clinical pharmacists to perform their training stages there.

All this has allowed us to increase our performance, rapidity of service, readjust medication usage and to plan for a more advanced evaluation of the computerized data that is now available.

The development of a whole department oncology electronic medical record

Problem: The available medical records system is still an old fashioned hard copy file system, housed in an archive room that no longer fits the large number of files. This has led to the loss of a quantity of valuable information and patient discomfort due to increasing waiting times for their file retrieval. Moreover, data collection is not standardized (but based on individual experience) and statistical analysis requires a huge amount of effort to go through the files. Furthermore, the installation of different EMR systems in other departments had failed due to the large number of patients seen per day and a lack of experienced personnel for data entry, which is more time consuming than the conventional paper system.

Solution: We customized a solution for an EMR system which consisted of:

- ▶ Customized sheets specifically designed for oncology

patients' data, with multiple tools to decrease doctors time spend on data entry:

- automatic guide for ICD-O and ICD-10 codes;
- automatic chemotherapy regimen dose calculation;
- CTCAE and RTOG toxicity guide.
- ▶ The project not only comprised the EMR programme, but also improvements to the infrastructure through:
 - a network system;
 - computerization of the clinics and data entry rooms;
 - cover from two data entry personnel, with medical backgrounds, who can enter the data into the medical records in their appropriate fields in the EMR.
- ▶ The development of such a programme allows for a rapid retrieval of masses of information about actual disease rates, survivals, and the actual needs as regards treatment machines and drugs.
- ▶ Big data-driven research.

Radiotherapy e-learning programme

Problem: One of the important challenges that faces oncology in developing countries is the lack of knowledge and the deficiency of experienced personnel. In radiotherapy, it's a more pressing problem due to price of technology related to it, the diversity of specialties involved in the treatment process and the "migration of minds" to developed countries (7). The access to foreign educational courses and e-learning programmes are usually quite expensive for low- and middle-income countries.

Solution: The migration of experienced personnel is actually an opportunity that can be used in "cheap" e-learning modules. This has led to the initiation of a teaching programme project in cooperation with our previous faculties that are now working in United Kingdom, France and the United States.

The low-cost web-based e-learning platforms are under evaluation for radiotherapy delineation and contouring courses. There is still a lack of educational programmes delivered to technicians, dosimetrists and physicists. In this setting, we are trying to deliver local training, but international e-learning modules still need to be implemented.

Radiotherapy infrastructure

Problem: The lack of infrastructure is a common problem in low- and middle-income countries. When it comes to radiotherapy machines, the issue is exponentially more complicated when it comes to machine acquisition, operation and maintenance. We have in our department one

linear accelerator and a cobalt machine. The linear accelerator treats approximately 80 patients per day, which is a large number for a single machine. Whenever there is a technical malfunction, maintenance is slow, partially due to time taken to import spare parts. These delays have a major impact on cancer patients survival and disease control. The cobalt machine has limited indications now and cannot be used in the majority of patients.

Solution: Many hospitals are able to improve their infrastructure through grants and donations from big corporates. In our department, we increased our radiotherapy armamentarium through the acquisition of a new Linear accelerator with improved technology and capabilities in comparison to previous machines. The funding for this project was donated by one of the biggest banks in Egypt, through their corporate social responsibility department. These kinds of opportunities are not usually well exploited by hospital policy-makers. An important clue for these types of projects to work, is to let the funding body be responsible of the delivery and installation process, thus neutralizing the hindering effect of a centralized bureaucratic process.

Conclusion

These examples of decentralized initiatives allow facilities to properly evaluate their customized needs, to develop and

build their infrastructure more efficiently and to adopt new technologies more rapidly. This experience pushed us to recommend a hospital-based assessment of needs combined with "out of the box" ideas to fund and incorporate the solutions. Although the non-conventional way of answering the needs of a hospital, beyond the available governmental role, is seductive, it should nevertheless be well controlled by legislation and be evidence-based. ●

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