Cancer Care in Pakistan

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Pakistan is a lesser-developed country in South-West Asia, with a large and young population. We review here the current burden of cancer in Pakistan, followed by an assessment of the current facilities for diagnosis and treatment of cancer in the country. An effort is made to define the key problems in the delivery of optimal cancer care, and some possible solutions are offered.

Key words: cancer – Pakistan

INTRODUCTION

Pakistan is a country in south-west Asia with an area of 310 403 square miles and a population in 2008 of 173 million. The gross domestic product (GDP) in 2010 was US$ 177 billion with a per capita GDP of US$ 2005, ranking 173rd in the world, and a per capita income of US$ 1257 or 138th in the world rankings. The human development index in 2011 was 0.504 making Pakistan 145th in the world rankings. Public sector spending on health in Pakistan is US$ 6.4 per capita. We review here the current burden of cancer in Pakistan, followed by an assessment of the current facilities for diagnosis and treatment of cancer in the country. An effort is made to define the key problems in the delivery of optimal cancer care, and some possible solutions are offered.

THE CANCER BURDEN IN PAKISTAN

No national data are available on incidence rates of cancer in Pakistan. Globocan 2008 (1) estimated the cancer incidence, mortality and prevalence in Pakistan as follows.

Cancer incidence was estimated as the weighted average of the observed rates in South Karachi (1998–2002) (2), the estimate for India and the national estimate for Iran (2008). These data were then applied to the estimated population by age and sex of, respectively: (i) urban areas of the Sindh province (ii) the rural Sindh province, Punjab province and Islamabad; (iii) Baluchistan and the North-West Frontier Province (source: 1998 census).

MORTALITY

The number of cancer deaths in 2008 was estimated from incidence estimates and site-specific survival, estimated by the GDP method. The number of cancer cases and cancer deaths were ‘scaled’ to the estimated World Health Organization total number of cancer deaths by sex for 2008 (3).

PREVALENCE

The prevalence of cancer was estimated from incidence estimates and the regional average of observed survival by cancer and age group.

Using this methodology, it is estimated that there are ~150 000 new cancer cases each year, and that between 60 and 80% of these patients will die each year. The age-standardized ratios for cancers are 172/100 000 for females and 145/100 000 for males (Tables 1 and 2).

Hepatocellular cancer is a common tumour in Pakistan, linked to the high background prevalence of hepatitis C and B. In 2007, our group published data on survival in hepatocellular cancer (5). This showed that most patients present with large, multi-focal tumours, with poor liver function. Sixty-one percent had evidence of prior infection with hepatitis B or
C. The advanced stage at presentation, poor background liver function in many and the absence of a national liver transplantation programme tended to limit treatment options. Only 14% of patients were considered suitable for definitive treatment. We have also previously published data on colorectal cancer in our patient population (6), showing that patients tend to be younger at presentation (the mean age of patients was 46.5 years) and tend to present with late-stage disease. Both studies emphasized the need for greater public awareness and health education. A 2002 study (7) from a hospital-based tumour registry in Pakistan identified poor socio-economic status in 89% of cases, illiteracy in 76%, co-morbid conditions such as hepatitis B and C in 37% of patients and advanced disease in 59% of patients. The authors concluded that optimal treatment was not provided on initial diagnosis to 45% of patients. In another study from our institution, currently in press (8), a group of investigators reviewed 2829 pathologically confirmed non-metastatic breast cancer patients managed at the Shaukat Khanum Memorial Cancer Hospital & Research Centre, in Lahore, from January 1995 to May 2009. They concluded that over 90% of non-metastatic breast cancer patients present with stage II and III disease and a significant proportion develop distant metastasis accounting for overall long-term outcomes inferior to those seen in more developed countries. They concluded that efforts needed to be directed towards raising the level of health awareness and establishing effective screening programmes to improve early detection of breast cancer in Pakistan.

**CURRENT FACILITIES FOR DIAGNOSIS AND TREATMENT**

Cancer continues to be largely a surgical disease in Pakistan, with most cancers presenting to and being treated by surgeons in the first instance. The principles of oncological surgery are not widely known and this is particularly evident in the treatment of breast and gall-bladder cancers, as well as with sarcomata of various kinds. With regard to surgery, a period of general surgical training, leading to the fellowship of the College of Physicians and Surgeons (CPSP) in general surgery, is usually the only formal training that surgeons receive in surgical oncology. In 2012, a specialized training programme in surgical oncology, commenced under the auspices of the CPSP. This is a second fellowship programme specifically geared towards providing training in the complexities of cancer surgery, but is currently available at only one centre in Pakistan.

Radiation Oncology has had a head start over Medical Oncology in Pakistan. Starting in the 1960s, the Pakistan Atomic Energy Commission (PAEC) has established a number of hospitals all over the country that provide cancer treatment. Initially, these focused primarily on the provision of radiation-treatment facilities. Gradually, they have come to deliver chemotherapy in addition to radiation treatment, but do not have surgery or palliative care services. In common with many lesser-developed countries, these hospitals tend to be under equipped and see many more patients than is ideal for the facilities available. Two nationwide surveys were carried out, using structured questionnaires, in 2005 and again in 2010, to assess the status of the radiation oncology infrastructure within the country (9). During this time, megavoltage teletherapy machines increased from 37 to 41, new patients registered in all the PAEC cancer hospitals increased from 33 000 to 46 000, conventional simulators increased from 15 to 21 and CT simulators increased from 0 to 7. Radiation treatment planning system provision increased from 15 to 26 and brachytherapy facilities from 12 to 13.

In 2004 there were 725 patients per medical physicist, a figure which improved to 632 patients per physicist in 2009. The number of radiation therapy technologists per shift per machine improved from 1.69 in 2004 to 1.9 in 2009. Repair and maintenance personnel increased from 2.11 for every 2 mV units in 2004 to 2.49 in 2009. Patients per radiation oncologist, however, increased from 439 in 2004 to 549 in 2009. The author concluded that, while there was an increase in the number of radiation therapy centres, equipment and human resources, this was insufficient to comply with international standards.

### Table 1. Top 10 cancers in males (4)

<table>
<thead>
<tr>
<th>Site</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung</td>
<td>10.5</td>
</tr>
<tr>
<td>Lip, oral cavity</td>
<td>10.5</td>
</tr>
<tr>
<td>Stomach</td>
<td>7</td>
</tr>
<tr>
<td>Other pharynx</td>
<td>5.6</td>
</tr>
<tr>
<td>Oesophagus</td>
<td>5.4</td>
</tr>
<tr>
<td>Leukaemia</td>
<td>5.2</td>
</tr>
<tr>
<td>Colorectum</td>
<td>4.7</td>
</tr>
<tr>
<td>Bladder</td>
<td>4.6</td>
</tr>
<tr>
<td>Larynx</td>
<td>4.3</td>
</tr>
<tr>
<td>Other and unspecified</td>
<td>42.1</td>
</tr>
</tbody>
</table>

### Table 2. Top 10 cancers in females (4)

<table>
<thead>
<tr>
<th>Site</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>26</td>
</tr>
<tr>
<td>Cervix uteri</td>
<td>15.7</td>
</tr>
<tr>
<td>Lip, oral cavity</td>
<td>6.6</td>
</tr>
<tr>
<td>Ovary</td>
<td>4.8</td>
</tr>
<tr>
<td>Oesophagus</td>
<td>4.2</td>
</tr>
<tr>
<td>Stomach</td>
<td>3.4</td>
</tr>
<tr>
<td>Leukaemia</td>
<td>3.3</td>
</tr>
<tr>
<td>Colorectum</td>
<td>3.3</td>
</tr>
<tr>
<td>Non-Hodgkin’s lymphoma</td>
<td>2.4</td>
</tr>
<tr>
<td>Other and unspecified</td>
<td>30.3</td>
</tr>
</tbody>
</table>
guidelines. An adequate enhancement in radiation oncology infrastructure is clearly needed to cope with the existing number of patients, a number that is predicted to rise dramatically in the next few decades. In 2006, Cavalli (10) estimated that close to two-thirds of the cancer cases predicted for 2050 would occur in low-income countries.

The first formally trained medical oncologists returned to Pakistan from training overseas in the 1980s. The speciality has been slow to develop since then, largely due to the absence, until the mid-1990s, of a formal national training programme and continuous loss of trained medical oncologists to overseas markets. There are currently less than 30 fully trained medical oncologists practising in the country, and most cancer patients will never see a medical oncologist throughout the course of their treatment.

Paediatric oncology as a distinct discipline has only begun to develop over the last two decades, with substantial increase in the facilities for treatment during this time. It was finally recognized as a distinct specialty for training by the CPSP in 2008. According to a recent review (11) there has been a gradual improvement in paediatric oncology nursing and allied facilities, although paediatric palliative care in Pakistan is still in its infancy. There is little systematic state funding for paediatric oncology services, and these continue to be supported largely by philanthropy.

Palliative care is a new speciality in Pakistan. In common with many other resource-poor countries, palliative care facilities are currently in an early stage of development (12). Given the large cancer burden and the advanced stage at presentation of many patients, the need for rapid development of this service cannot be sufficiently emphasized. There is at the current time only one formally trained palliative care physician in the country. Oncologists tend to palliate their own patients, and the quality of care provided is often less than adequate. Anaesthetists provide some pain relief measures, but this service is patchy and of variable quality. Opioid availability is a major problem, ironic in a country with significant production and availability of illegal opioids. The application process to obtain opioids for patient use is complex. There are currently four different government departments from whom permission needs to be sought for each shipment of opioids, a process which can take up to 6 months to complete on each occasion (13). At the present time, the ‘registered’ narcotics theoretically available for use are oral and parenteral formulations of morphine sulphate, parenteral pethidine and fentanyl, oral codeine phosphate, oral and parenteral buprenorphine and fentanyl patches. The newly formed Drug Regulatory Authority of Pakistan (DRAP) has formulated new rules wherein any narcotics not already registered in Pakistan cannot be imported. Registered narcotics cannot be imported directly by institutions. The rules state that only companies approved by the DRAP can import narcotics.

There are fewer than five hospices in the entire country, all operated by charitable organizations, and run by dedicated, but not formally trained, staff.

PROBLEMS IN DELIVERY OF OPTIMAL CANCER CARE

INADEQUATE TRAINING IN ONCOLOGY

Undergraduate training in oncology is minimal (14) and contributes to lack of awareness among physicians as to how to screen for cancer, how to diagnose cancer and how to refer appropriately following diagnosis. Communication skills and training in breaking bad news, both so important in cancer management, are other areas which receive scant attention in the undergraduate curriculum (15).

Post-graduate training is more structured, with one- to two-year diploma programmes, or more formal fellowships of the CPSP in medical oncology, radiation oncology, paediatric oncology and now also in surgical oncology. A few physicians have continued to train overseas, but most of these do not return to Pakistan following the completion of training.

There are currently only six sites nationally which are approved for training leading to the Fellowship of the College of Physicians and Surgeons (FCPS) in medical oncology. Radiation oncology is a stand-alone speciality, with its own exit examination and FCPS diploma. Since 2000, 12 trainees have qualified in and passed the exit examination for medical oncology, 29 trainees have passed the exit examination in radiation oncology and three trainees have obtained the FCPS in paediatric oncology. It is generally felt that there is a paucity of middle-tier oncology professionals, such as physicists, technicains and specialist nurses, and that there is a dire need for further training and for improving the quality of care provided (16).

INFRASTRUCTURE AND PERSONNEL

Currently, there are 21 dedicated hospitals which treat only cancer where the bulk of the work centres around cancer diagnosis and treatment. Another 50 general hospitals have facilities to treat cancer with chemotherapy and/or radiation. These tend to be larger hospitals in major urban centres. Nationally, there are approximately 125 oncologists of all descriptions with some sort of post-graduate qualification practising medical and radiation oncology (17).

LACK OF AWARENESS OF CANCER

It has been shown above that the majority of patients tend to present at a late stage in their disease (5–8). This is multifactorial. Economic considerations cause patients to avoid going to see a doctor for as long as possible and they are often unable to afford expensive investigations. This means that both patients and physicians tend to prefer symptomatic treatment over a more systematic diagnostic approach. As a result, general practitioners rarely diagnose cancer, and it is unusual for cancer to be diagnosed early. Unfortunately, many specialists tend also to treat cancer incorrectly and without reference to current recommendations, surgeons being a case in point.
A national cancer plan was developed in 2004 (18), as part of a wider plan for non-communicable diseases. Key targets were centred around legislation regarding tobacco, for which there has been some measure of success, the development of a pain control policy and a palliative care network, public health education, primary prevention, capacity building, counselling and population screening, for all of which little tangible evidence of meaningful effort exists.

TOWARDS A SOLUTION

EDUCATION AND TRAINING

Significant challenges exist for the future of oncology within Pakistan. Among the most serious are those related to training of physicians, nurses and allied technical staff. It has become much more difficult, in the last decade, for Pakistani physicians to train overseas, adding impetus to the need for well-designed and relevant training programmes within the country. There are currently insufficient numbers of training slots and a second fellowship means an additional two to three years of work at a relatively junior, and thus financially unrewarding, level. It is, nevertheless, essential that the number of training positions in the various oncologic disciplines be increased. Job opportunities within the country are also limited, particularly in the government sector hospitals, which have traditionally provided employment for specialist physicians. Only when we can provide adequate employment opportunities to our trained personnel can we hope to stem the continuous attrition of the country’s trained workforce by employers overseas.

INFRASTRUCTURE DEVELOPMENT

The relatively small numbers of radiation machines and allied treatment facilities often mean that despite training in radiation oncology, radiation oncologists still have to practise largely as medical oncologists. Investment in infrastructure has occurred, as described above, and needs to continue. Over the last decade, 25 cobalt machines and 12 linear accelerators have been installed in government sector hospitals, while a further ten linear accelerators have been installed in private sector facilities.

The costs of treatment of cancer continue to rise, coupled as they are to ever-increasing drug costs as well as the costs of improving technology, for both diagnosis and treatment. Over the last decade, the expense on cancer drugs has nearly quadrupled at the SKMCH&RC, partly due to increasing numbers of patients seen and treated but also because of the increasing availability of new and expensive cancer treatments. Interestingly, despite this huge overall increase in drug budgets, the institution has managed to keep the moving average price of high-cost cancer drugs stable by use of high-quality generic drugs as they become available, coupled with a decrease in price of drugs coming off patent. This represents an example of the kind of innovative strategies needed to be able to provide high-quality care to the maximum numbers of patients.

CANCER REGISTRIES

The need for accurate population-based data on cancer incidence and mortality cannot be overemphasized. Only when such data are available can policy-makers expect to make sensible decisions on allocation of precious healthcare resources. The current parlous state of cancer data collection in Pakistan needs to improve. There are currently only two population-based cancer registries in the country. The second of these is the Punjab Cancer Registry, established in 2005 in Lahore, under the umbrella of the Shaukat Khanum Memorial Cancer Hospital & Research Centre, and currently covering the city of Lahore, with a population of 15 million. In November 2011, the International Association of Cancer Registries awarded Associate Member status to the Punjab Cancer Registry.

RESEARCH IN ONCOLOGY

Research into the causes and treatment of cancer remains rudimentary. While islands of research excellence exist, a culture of research and scientific inquiry is generally lacking. The time and effort of most oncologists is taken up in dealing with the vast numbers of patients they are required to see, leaving little time for all but the most enthusiastic to devote to research. A Pubmed search, using the keywords ‘cancer’ and ‘Pakistan’ produces 1223 hits, the majority of which are descriptive and retrospective series. There is little basic science research and few collaborative studies.

Cancer research can be difficult and complex to perform anywhere in the world, but these challenges are greatly magnified in developing countries. Some of the challenges to conducting meaningful cancer research in the developing world include uncertainties about ethical research conduct, the costs of cancer research and the complexity of, and the time involved in, obtaining approvals for new products (19). Only when these challenges are satisfactorily overcome can local research be successful in providing the evidence that is relevant to the needs of our own populations and that will translate into improved cancer care for our patients.

CANCER SCREENING AND PREVENTION

Significant improvements can, nevertheless, be wrought in the landscape of cancer in Pakistan through relatively few interventions. Breast cancer is the commonest tumour seen in females. Serious and sustained efforts to provide healthcare education and screening facilities would have tremendous impact in reducing the morbidity and mortality associated with this disease. It is to be hoped that a decline in the prevalence of hepatitis B-associated hepatocellular cancer will be seen, following the introduction of hepatitis B vaccination, but the paucity of data on disease prevalence makes this difficult
to confirm. While it may not be practical to recommend wide-spread HPV vaccination in Pakistan at this time, the provision of training in performing and reading cervical smears, followed by the introduction of a national cervical smear surveillance programme, is considered by many to be an achievable goal.

HEALTH EDUCATION

A concerted effort to control the use of tobacco and betel nut would have significant impact in reducing the incidence of cancers of the lung and oral cavity. Similarly, greater public awareness of breast cancer and the need for regular breast self-examination ought to lead to earlier diagnosis, with improved treatment outcomes. Yoo (20) states that the ‘first step that is needed is to raise public awareness about cancer; a public awareness campaign is the number one priority and should begin immediately’.

THE FUTURE

In conclusion, the challenges facing oncology in Pakistan are numerous and multi-faceted. There are large numbers of patients and insufficient data from cancer registries, making planning for the future very difficult. Patients present at an advanced stage, there are no screening programmes and the national cancer plan, well intentioned as it undoubtedly was, has not been implemented. There are wide variations in the standards of care, no formal palliative care facilities, a dearth of trained manpower and a paucity of training opportunities, both locally and overseas. A culture of research is lacking, although it is developing slowly—opportunities are certainly aplenty. The future ought to involve enhanced partnership between the private sector and philanthropic organizations or funding agencies, since the government is increasingly seen as being incapable or unwilling to provide health care. National priorities in this struggle ought, perhaps, to be focused on cancer prevention, early detection and therapy, development of a national cancer registry and collaboration between cancer centres in training as well as in research.

It is postulated that by 2030, 70% of all reported cancer cases will originate from low- or middle-income countries (21). Given that cancer afflicts those, principally, in the prime of their lives, more thought needs to be given to calculating the loss of productivity and the economic impact nationally when allocating resources to cancer care.

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Conflict of interest statement

None declared.

References