

Cancer Treatment in Nepal: A Historical Background, Development of Treatment Facilities, Epidemiology and Challenges for Prevention and Control of Cancer.

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ABSTRACT

Cancer incidence is increasing and becoming a leading cause of death worldwide. Deaths from cancers continue to increase worldwide, particularly in countries with low and middle income leading to a global burden. The burden of cancer is not less for Nepal. Cancers of lung, uterine cervix, head & neck, breast and stomach are the most common types in Nepal. Due to the high prevalence of tobacco smoking, lung cancer is the commonest in both genders in Nepal and is usually treated palliatively. The majority of cancer patients still attend only 7 major hospitals of the country at an advance stage. Head & neck cancers in both genders and cancer of uterine cervix in

females are the most common cancers treated with curative intentions. Elderly patients are more likely to receive palliative treatment rather than curative radiotherapy. Major group of cases have been found between 4th to 7th decades of life in both genders. The cancer registry system of Nepal is very poor. A population-based national cancer registry system does not exist. However, a new cancer registry system supported by WHO was established only in 2005 to collect cancer data from 7 major hospitals. It was a helpful step to gather at least basic data to publish hospital-based reports. Though, there has been recent advancements in cancer treatment, Nepal is still struggling to improve and manage even conventional modalities for cancer treatment despite many socio-economic and political conditions. Due to the poor infrastructure of the health care system, the Nepalese government can hardly support the expensive cancer treatment expenditures. The Government has been conducting major public awareness and screening programs for prevention and control of cancer. Various organizations are co-operating with the Government in this regard.

Keywords: Cancer; Risk factors; Tobacco; Prevention; Control.

INTRODUCTION

In Nepal, and many other developing countries, cancer is traditionally believed to be a disease of death. In the medical profession, cancers are believed to be primarily an environmental disease. About 5-10% of cancers occur due to genetics, the rest are due to environmental factors such as food habit, lifestyle and environment.¹ The frequency of cancer appears to be increasing, especially in developing countries including Nepal, leading to a serious impact on quality of life and survival of patients. This results in an extra burden to poor countries like Nepal. The serious concern is that the deaths from cancers continue to increase worldwide leading to a global burden. Cancer has become the leading cause of death worldwide in economically developed countries, and the second highest cause of death in developing countries.²⁻⁸ Due to poor cancer registry system the exact cancer data is unknown for Nepal. The incidence of cancer continues to increase every year.^{8,9} The most common types of cancers in Nepal are the cancers of cervix uteri, lung, head & neck, breast, stomach, lymphoma and leukemia.⁸⁻¹² Lung cancer is the commonest in both genders in Nepal. This could be due to lack of awareness and higher prevalence of smoking.^{8,9,11-18} In most under-developed and developing countries cancer treatment facilities are very poor.¹⁹ Cancer treatment facilities are available only in the 7 major hospitals[†] in Nepal^{9,12} (Fig. 1). A major number of cancer patients die due to lack of treatment facilities in Nepal. The purpose of this article is not only to serve as a source of information, but also as inspiration to those who want to join the battle against cancer.

Historical background and development of cancer treatment facilities in Nepal

The history of cancer treatment in Nepal is very short. Bir Hospital is the first center in Nepal which served as a central institution for cancer treatment until other cancer centers were established in the country. Bir Hospital is one of the oldest and the biggest government general hospital

of Nepal which is centrally located at the capital city, Kathmandu. Primarily, only chemotherapy and surgery were available. The new era of cancer treatment with radiotherapy began only in the past two decades when the first tele-cobalt radiotherapy unit in the country was installed. This was in 1991 in the Bir Hospital in cooperation with the Indian government. Patients from all parts of the country visit this hospital for cancer treatment.

Cancer treatment worldwide is very costly requiring expensive facilities, highly specialized health personnel and expensive drugs. Patients from developing and under-developed countries can hardly afford this kind of expensive treatment. Nor are the governments of developing and under-developed countries, including Nepal financially capable to expand these services fully. About 35 % of the population in Nepal is still below the poverty line. Over 90 % of the total poor population live in rural areas and only 41.4% of rural households have access to the nearby health institution within a short walking distance.²⁰ Though, the Government of Nepal has declared health care as the fundamental right of every citizen, the infrastructure of health care system is still very poor. Cancer management receives the lowest financial contribution from the Government, as it is their lowest health priority.

Advanced technologies, like heavy ion therapy, have recently started in some developed countries like Japan and few others with more promising results in cancer treatment.^{21,22} Nepal is still struggling to improve and manage even conventional modalities for cancer management. Cancer management including treatment, prevention and control is slowly improving in Nepal. Steady progress has been achieved to some extent in past two decades, despite many socio-economical and political conditions which badly dragged the country to backward. Approximately 85% of world's population lives in the developing countries, but not even a third of the world's cancer treatment facilities such as radiotherapy are available in these developing countries.¹⁹ Cancer treatment facilities are very poor in Nepal. Although cancer services have been started in 7 major hospitals of the country, only 5 of them have radiotherapy facilities.^{9,12} Four centers are located in the Central region. Out of them three are located in Kathmandu valley and 4th one in Bharatpur, Chitwan. The 5th center is located in the Teaching Hospital, Manipal college of Medical Sciences, Pokhara in Western region. Recently, some private hospitals have also started radiotherapy and some are planning to start with one or more treatment modalities.

[†] Major hospitals of Nepal dealing with cancer patients:

1. B. P. Koirala Memorial Cancer Hospital, Bharatpur, 2. Bir hospital/National Academy of Medical Sciences (NAMS), Kathmandu, 3. Teaching Hospital, Tribhuvan University, Kathmandu, 4. Kanti Children's hospital, Kathmandu, 5. Bhaktapur Cancer Hospital, Bhaktapur, 6. Teaching Hospital, B. P. Koirala Memorial Institute of Health Sciences, Dharan, 7. Teaching Hospital, Manipal College of Medical Sciences, Pokhara.

Presently, B. P. Koirala Memorial Cancer Hospital, Bharatpur, contributes to the treatment of most cancer patients.⁹ This hospital was founded by the Government of Nepal in 1992 and it started offering out patients and day care services from 1995 only. In 1999, with the cooperation of Chinese Government, it was established as the first national cancer center of its kind to fight against cancer in Nepal. Patients visit this hospital for cancer treatment from all districts of Nepal and also some neighboring parts of India. Majority of Nepalese patients visiting this hospital are recorded to come from the nearby districts of Narayani, Gandaki and Lumbini zones.⁸ The Teaching hospital of Manipal College of Medical Sciences, in Pokhara, started their radiotherapy service with a Cobalt-60 unit in September 2000. Later in 2002, a high-energy linear accelerator combined with a simulator and treatment planning system was installed. The majority of patients who visit this hospital come from all the districts of Western region and some other parts of the country. This center has been offering a good service to patients of this region, especially those who cannot go to Kathmandu or Bharatpur cancer centers for treatment.

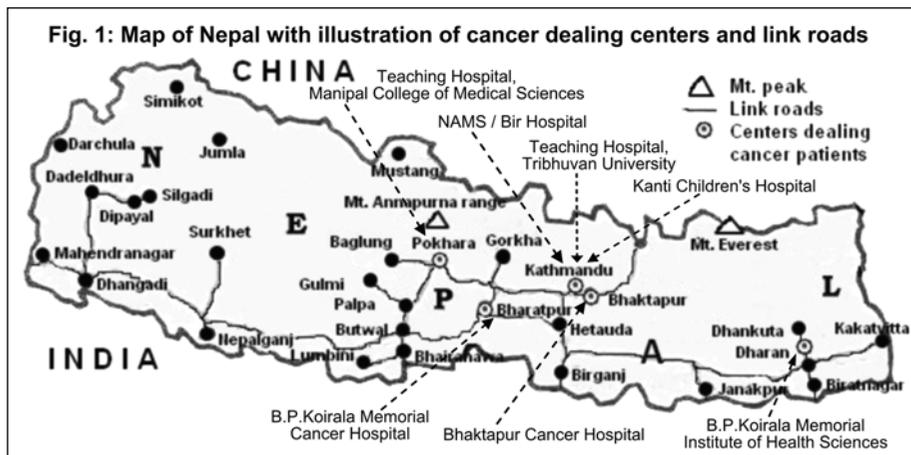
All cancer treatment centers of Nepal are working under the pressure of a high patient load. Hospital records show that more than 50 cancer patients are treated every day with radiotherapy in these cancer centers. Cancer centers are unable to treat all patients visiting these centers due to the existing hospitals lack sufficiently qualified technical man power, advanced technology and other facilities to provide a full-ranged multi-disciplinary quality treatment. This is a major problem in the health care system in Nepal. According to the records (Feb, 2012) of major hospitals, there are only 20 radiation oncologists and 8 radiation physicists available in the country. Most of them are working in Kathmandu Valley. The National Academy of Medical Sciences (NAMS) has adopted Bir hospital and B. P. Koirala Memorial Cancer Hospital, Bharatpur for a post graduate degree (M.D. in radiation oncology). Producing radiation oncologists trained within the country, is a new achievement for Nepal.

Epidemiology of cancer in Nepal

The exact prevalence rate of cancer is not known for Nepal. This is because the cancer registry system is very poor, and a population-based national cancer registry system does not exist in Nepal. However, some hospital-based and local population-based data of cancer treatment are available. In 2005 there were 4397 cancer cases reported from 7 major hospitals dealing

with cancer patients.⁹ B. P. Koirala Memorial Cancer hospital, Bharatpur has the highest number of cancer patients, visiting from most districts of Nepal and some neighboring parts of India.^{8,9} In 2000, the total number of out-patients registered at B. P. Koirala Memorial Cancer hospital, Bharatpur, was 47708. Only 495 of them were admitted for cancer treatment. In 2010, the total number of out-patients registered was 87042. Among them 17.31% were diagnosed as cancer patients, and 5442 patients were admitted for cancer treatment.⁸ During the same year, there were 1387 new cancer patients recorded in Bhaktapur cancer hospital and 686 patients in Bir hospital (Unpublished data collected from hospital records). The data from the major hospitals in Nepal, shows a significant increase in the number of cancer patients attending these hospitals over the last 10 years. Females have been found to be more affected than males in Nepal.⁸⁻¹² Based on the data of major hospitals, at present, approximately 8000-10000 new cancer patients per year can be estimated for the whole of Nepal. As the cancer cases are rising significantly in Nepal, deaths from cancers are also rising. More than 70% of all deaths from cancer are from countries with low and middle income. Deaths from cancers are projected to continue rise and over 11 million deaths are estimated worldwide by 2030.⁵

The most common types of cancers worldwide are those of the lung, stomach, liver, colon, rectum, esophagus and prostate in males, whereas cancers of breast, lung, stomach, colon, rectum and cervix uteri are most common in females. The frequency varies from country to country as well as between genders.³⁻⁵ In Nepal cancers of lung, oral cavity, larynx and stomach are the most common in males, whereas in females cancers of cervix uteri, breast, lung and ovaries are the most common.⁸⁻¹² The number and type of cancer patients attending the cancer dealing hospitals of Nepal varies considerably from region to region.^{8,9} This mainly depends on the availability of therapeutic modalities, geographical location of the hospitals and transportation facilities to reach these centers. It also depends on the surrounding ethnic communities and their exposure to certain risk factors (e.g. tobacco and alcohol) and the socio-economical status of the population. Different religious faiths and cultural issues may also reflect some of the variation in relative prevalence rates of cancers in certain places.^{23, 24} The majority of cancer patients visit cancer centers in Central region as the most of them are located in Central region.^{8,9} These centers are linked by national roads with better transportation facilities (Fig. 1). The majority of cancer patients have advanced stages of the disease by the time they attend the major hospitals of Nepal. The



three most common types of cancers observed in the major hospitals of Nepal are shown in Table 1. Cancers of head & neck, lung and cervix uteri are the 3 most common malignancies observed in patients attending to teaching hospital of Manipal College of Medical Sciences, Pokhara in Western region. Cancers of cervix uteri, trachea & lung and breast are the 3 most common types observed in B. P. Koirala Memorial Cancer Hospital, Bharatpur in Central region. Cancers of trachea & lung, stomach and breast are the 3 most common types observed in Bir hospital (NAMS), Kathmandu in Central region. Cancers of trachea & lung, breast and cervix uteri are the 3 most common types observed in Bhaktapur Cancer hospital, Bhaktapur in Central region. Cancers of trachea &

lung, stomach and breast are the 3 most common types observed in teaching hospital of Tribhuvan University, Kathmandu in Central region. Likewise, cancers of trachea & lung, breast and buccal cavity are the 3 most common types observed in teaching hospital of B. P. Koirala Memorial Institute of Medical Sciences, Dharan in Eastern region.^{8,9,11,12}

Lung cancer is the commonest cancer and major contributor in both genders in Nepal.^{8,9,11-13} Worldwide also lung cancer is the leading cancer in males and breast cancer is the most frequently diagnosed cancer in females. In 2008 breast cancer was the leading cause of death among females, accounting for 14% of total

Table 1. Three most common types of cancers observed in major hospitals of Nepal.

Institutions	Region	I	II	III
Teaching Hospital, Manipal College of Medical Science, Pokhara, Kaski.	Western Region	Ca Head & Neck	Ca Lung	Ca Cervix Uteri
B.P.K. Memorial Cancer Hospital, Bharatpur, Chitwan.	Central Region	Ca Cervix Uteri	Ca Trachea & Lung	Ca Breast
Bir Hospital, NAMS, Kathmandu.	Central Region	Ca Trachea & Lung	Ca Stomach	Ca Breast
Bhaktapur Cancer Hospital, Bhaktapur.	Central Region	Ca Trachea & Lung	Ca Breast	Ca Cervix Uteri
Teaching hospital, Tribhuvan University, Kathmandu.	Central Region	Ca Trachea & Lung	Ca Stomach	Ca Breast
B.P.K. Memorial Institute of Medical sciences, Dharan, Sunsari.	Eastern Region	Ca Trachea & Lung	Ca Breast	Ca of Buccal cavity

cancer deaths.³⁻⁵ Lung cancer is the most common cancer worldwide, accounting for 1.3 million deaths annually.⁷ Lung cancer has emerged as the leading cancer among males in developing countries, including Nepal.^{8-13,25} There is higher frequency of lung cancer among females in Nepal compared with other developing countries. Females between 30 to 60 years have been especially affected, and have a higher frequency than males. This could be due to poor public awareness and the higher prevalence of smoking among females, particularly in rural communities.^{8,9,14-18} Studies in Western Nepal showed that lung cancer is the most common malignancy among those treated with a palliative intention, while head & neck cancers in both genders and cancers of cervix uteri in females have been found the most common cancers treated with a curative intent. Lung cancer is one of the common causes of death treated palliatively.^{11,12} Patients in older age groups are more likely to receive palliative treatment rather than curative radiotherapy.^{12,26} Likewise, cancer of the larynx is the second most common cancer among males in some southern parts of Nepal. It is also one of the leading cancers in the neighboring countries of India, Pakistan and Bangladesh. This can be attributed to the higher prevalence of smoking and chewing of tobacco among males compared to females.^{10,24,25,27,28} The majority of cancer cases in Nepal have been observed between 4th to 7th decade of life of age in both genders.^{8,9,12} The cause behind this could be poor awareness and education about cancer and its risk factors, leading to late recognition of the early signs of cancers. Unfortunately, many patients have their treatment terminated or interrupted due to unavailability of staff, equipment breakdown, socio-economical conditions, and fear from treatment toxicity. In many instances political events, frequent strikes and transport blockades also badly affect the treatment regimen. These situations lead to postponement of the treatment regimen leading to complications and worsening of the patient's conditions.

Cancer registry system in Nepal

Epidemiological information of cancer diseases such as incidence, prevalence rates, patterns of disease and risk factors are essential for evaluation, planning and implementation of cancer prevention and treatments. Unfortunately, this information is not available for most of the under-developed and developing countries of the world. In the context of the developing countries of South Asia, especially SAARC (South Asian Association for Regional Cooperation) countries, the cancer registry system is not developed. Afghanistan, Bangladesh,

Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka are the member-countries of SAARC. None of the countries have reliable population-based cancer statistics to define the actual epidemiological situation of the country. In some regions of India, Pakistan and Sri Lanka, cancer studies have collected comprehensive hospital-based and local population-based data.^{23,25,29-35} In Nepal and other SAARC countries, the cancer registry systems are much poorer with limited data.^{9,11,24,36} In Nepal there is no central agency to coordinate a national cancer data registry from all government and private hospitals. This would give accurate national cancer statistics for the population. No scientific research or clinical reports are available regarding the incidence, prevalence, mortality, survival of patients and cost effectiveness of cancer treatment based on the entire population of the country. Very few hospital-based studies and reports have been published. There are only preliminary data of cancer incidence from some selected general hospitals, teaching hospitals of some medical colleges and few cancer hospitals in deferent regions of the country. Although, these reports also do not represent the national figure, they do provide some valuable information of cancer epidemiology in different regions of Nepal.^{9,11-13,36} In 2005 a new network for registration of cancer data was established in Nepal with support of WHO. The system pulled in cancer data from 7 major hospitals in three development regions of the country. This registry system was a new step in the development of epidemiological studies of cancer in Nepal, making it possible to gather at least some basic cancer data to publish hospital-based reports. However, there are some limitations to this system. As the data are not available in the public domain, the results can not be compared with or referenced against international data.^{9,11}

Prevention and control programs, and helping organizations to fight against cancer in Nepal

Nepal, being a poor country the fight against cancer is a very challenging work. Many governmental and non-governmental organizations (NGO) have been carrying on huge efforts and budgets to prevent and control cancer worldwide. The International Union Against Cancer (a global consortium of more than 350 cancer-fighting organizations from over 100 countries) is coordinating this work with developing countries including Nepal.

Two main steps have been taken to enhance the prevention and control of cancer in Nepal. Public awareness and health education are the primary steps

to promote the avoidance of risk factors and change unhealthy food habits. The most common environmental risk factors leading to cancers are tobacco consumption (25-30%), unhealthy diet and obesity (30-35%) and infections (15-20%). The remaining risks are radiation, environmental pollution and lack of physical activity. Age is also one of the most significant risk factors.¹ There are some specific substances, including tobacco and alcohol, which have causative links with particular cancers. Tobacco smoking is responsible for 90 % of lung cancers. Tobacco chewing has been found to be associated with cancers of the oral cavity, esophagus and stomach.^{10,37-39} In most developing countries, including Nepal, tobacco smoking is the major risk factor responsible for lung cancer. Smoking is increasing in Nepal and other developing countries, resulting in a significant increase in incidence of smoking related diseases like lung cancer and chronic obstructive pulmonary disease (COPD).^{14-18,27,28,40,41} Prolonged exposure to environmental pollutants like asbestos, chemical by-products and poisonous gases are associated with mesothelioma and others.^{13,39,42,43} About 30% of cancer deaths are due to the unhealthy behavioral and dietary risks. About 40% of cancers can be prevented by changing unhealthy behaviors⁶. A major proportion of population in Nepal is not aware about these risk factors leading to cancer. Therefore, the awareness about risk factors among them becomes essential to prevent and control cancer in the country.

The second step is a cancer screening program to enhance the prevention and control of cancer in Nepal. This would help to identify cases of early cancer or pre-cancerous stage disease. A screening program would include regular health check-ups with chest X-ray for lung cancer, mammography for breast cancer, cytology (Pap smear) for uterine cervical cancer, immunological cancer marker tests for different cancers. It would also include counseling people to raise awareness of risk factors including tobacco, alcohol and other responsible substances. It may be possible to decrease the cancer burden by one-third if cases are detected early in localized stage and treated early.⁶

To raise the public awareness and encourage for prevention, early detection and treatment of cancer the Government of Nepal and NGOs regularly conduct public awareness programs by radio, television, public lectures and printed materials. Many national NGOs including Nepal Cancer Relief Society and Cancer Society Nepal as well as international NGOs e.g. WHO, Rotary International and Lions Clubs International cooperate the Government of Nepal in the prevention and control

of cancer diseases. Every year on World Cancer day (4th February) a campaign of awareness programs are held through out the country aimed at the public. These emphasize the avoidance of risk factors like smoking, alcohol, unhealthy food habits and etc. to prevent cancers. The Nepal Cancer Relief Society (NCRS) has been playing a leading role in prevention and control of cancer diseases in the country in cooperation with the government and nongovernment health and educational institutions, communities and professional organizations. NCRS is a national NGO with a network of more than 40 districts branches in Nepal. One of its major activities is a mobile cancer screening program with health education. These are conducted primarily in the remote areas of the country. NCRS also provides scholarships for health practitioners (e.g. doctors or nurses) for higher studies in cancer management. NCRS also subsidizes patients (especially the poor) with partial or full treatment costs. It can also subsidize the travel costs for patients and nearest relative required to visit the cancer centers in Nepal or India for treatment. There are also some other charitable trusts which provide assistance to cancer patients from the underprivileged population for their treatment.

Strategy and future plan

Most of the major hospitals of Nepal dealing with cancer are located in the central region. Cancer patients from distant and remote areas cannot afford to go far away to major cities to receive treatment. Therefore, it is necessary to develop regional cancer centers with basic facilities of diagnosis, surgery and radiotherapy in the other regions of the country. This would allow early diagnosis, local access and affordable comprehensive treatment facilities. It is also necessary to establish a national institute for study and treatment of cancer diseases with advance academic and research facilities. Modern diagnostic and treatment facilities with well-trained experts should be there to provide multi-disciplinary approaches for treatment and study of cancer patients referred from other centers of the country. A national cancer registry system with networking with all cancer treating centers should be developed to ensure proper digital record and documentation for population-based study on various aspects of cancer diseases in Nepal. The national data generated on cancers will be able to guide the future planning and projection of cancer management in the country. It would be welcomed if national and international NGOs like WHO, IAEA and other related organizations extend their co-operation to guide and develop the management for this specialized and

expensive field of health care for better quality of life and survival of patients in developing countries like Nepal.

CONCLUSION

Increasing numbers of Nepalese youth are regular consumers of tobacco and alcohol and have adopted other risk factors, which may further increase the incidence of cancer in Nepal. Cancer is becoming a serious concern and a big burden for Nepal. Due to many circumstances, there is a gross failure to use the available scientific knowledge and technology towards improving the health status and quality of life of cancer patients in the country. If serious and effective actions are not taken timely to control the risk factors and provide more facilities for early diagnosis and treatment, it will soon lead to a major burden to the country, which could further negatively affect the socio-economic status of Nepal. Huge expenses can be saved in future by developing long-term national plans now with effective steps of preventive measures to control cancer. The Government and public efforts are most essential to promote this challenging work for better cancer management. On the way to fight against cancer, let us conclude with a quotation of a great Indian poet (Nobel laureate), R.N.Tagore: "Let me light my lamp and never debate whether it will remove the darkness."

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