

Institution-based Assessment of Cancer Patients Treated by External Beam Radiotherapy in the Rural Area of Sindh, Pakistan: Five Years of Data Analysis

Muhammad Waqar**, Muhammad Shahban*, Quratulain Soomro**,
Muhammad Nawaz Abro**

*Medical Physics Division, Nuclear Medicine Oncology and Radiotherapy Institute
Nawabshah (NORIN), Nawabshah, Pakistan

**Clinical Oncology Division, Nuclear Medicine Oncology and Radiotherapy Institute
Nawabshah (NORIN), Nawabshah, Pakistan

Abstract

Background: Nuclear Medicine Oncology and Radiotherapy Institute Nawabshah (NORIN) is a newly established full-fledged healthcare facility for diagnosis, treatment, and research of all cancer types in rural areas of Sindh, Pakistan. Nuclear Medicine Oncology and Radiotherapy Institute Nawabshah began its radiotherapy services in January 2012. We have conducted this study to assess cancer patients who registered in the Radiotherapy Department and received external beam radiotherapy at this institute in Pakistan.

Methods: We gathered institution-based data on cancer incidence distributed according to gender, age, district, tumor location, and stage of cancer when patients registered in the Radiotherapy Department of the Nuclear Medicine Oncology and Radiotherapy Institute Nawabshah. In total, we included 2116 patients in this study from 2012 to 2016 who received irradiation administered by a cobalt-60 machine.

Results: The most common cancers were located in the head and neck region in males and breast in females. Most patients presented to the Nuclear Medicine Oncology and Radiotherapy Institute Nawabshah with disease stages III and IV. Data from patients treated by external beam radiotherapy has indicated that most were 40-85 years of age. The Nuclear Medicine Oncology and Radiotherapy Institute Nawabshah is located in Nawabshah District. Therefore, most patients who presented to this institution were residents of Nawabshah and neighboring districts.

Conclusion: Late stage diagnosis, lack of awareness, and low socio-economic status in rural areas of Sindh is of tremendous concern. The establishment of a cancer detection campaign and initiation of a cancer control program is vital for an efficient fight against cancer.

Keywords: Stages, Rural area, External beam radiotherapy, Socio-economic status, Head and neck cancer

♦Corresponding Author:
Muhammad Waqar, MS
Nuclear Medicine Oncology and
Radiotherapy, Institute Nawabshah
(NORIN), Nawabshah, Pakistan
Email: phy_waqar@yahoo.com



Introduction

Cancer is a serious health threat and the leading cause of death in rural areas of Pakistan. According to a survey, deaths due to cancer have increased daily. The number of new cancer cases in Asia will increase to 7.1 million by 2020.^{1,2} This non-communicable, deadly disease is a serious threat to health in many Asian countries and needs utmost encounter.^{3,4}

Pakistan, a developing country, is situated in the South Asian region which is considered the most populous region in the world. Pakistan, as with other developing nations, faces tremendous health related issues. Cancer is responsible for the majority of increased causes of death in Pakistan.^{5,6} The precise incidence of cancer and number of deaths attributed to cancer is not known, especially in rural areas, because there is no comprehensive database or registry of cancer patients in Pakistan. Statistics are restricted to the available hospital data.

Pakistan is facing a double burden of diseases such as cancer and a rising trend in risk factors compared to other countries, as it is the seventh largest populous county in the world and a republic in south central Asia.

The Nuclear Medicine Oncology and Radiotherapy Institute Nawabshah (NORIN) is a comprehensive healthcare facility for diagnosis, treatment, and research of malignant disorders. It was established with the objective to adopt the latest research methodologies for cancer management. All major oncology diagnostic and treatment facilities that include radiation oncology, chemotherapy, nuclear medicine, radiology, and a comprehensive laboratory setup are available at NORIN. The center has computerized SPECT gamma cameras, a cobalt-60 teletherapy machine, simulator, treatment planning system, dosimetry system, treadmill stress machines, laboratory systems, and digital X-ray machines. This center has been functional since 2012.

This report is an institution based data of cancer incidents in the region with relative occurrence of different cancer types. Although not based on a detailed survey and in the absence of any detailed

national level population based cancer database, we can consider this data to be a major reliable source of information in terms of cancer occurrence and frequency of different types of cancers. Nuclear Medicine Oncology and Radiotherapy Institute Nawabshah is a tertiary cancer care center whose statistical data may differ from other cancer hospitals in other areas of Pakistan.

Materials and Methods

A cobalt-60 teletherapy machine is used for external beam radiotherapy for different cancer treatments in NORIN Nawabshah. This retrospective study, conducted in the Radiotherapy Department, has analyzed both genders of cancer patients and all age groups treated with the teletherapy machine from January 1, 2012 to December 31, 2016. We gathered all of the data from manual records kept during this time and verified them with the hospital database system. We considered age, gender, residential area, malignancy, and cancer stages to be significant contributors to cancer. This was the first report since the establishment of the Radiotherapy Department of NORIN in 2012. Diagnosis and staging were determined according to international protocols by experienced oncologists.⁷

Results

We presented cancer data from one comprehensive tertiary care cancer institute.

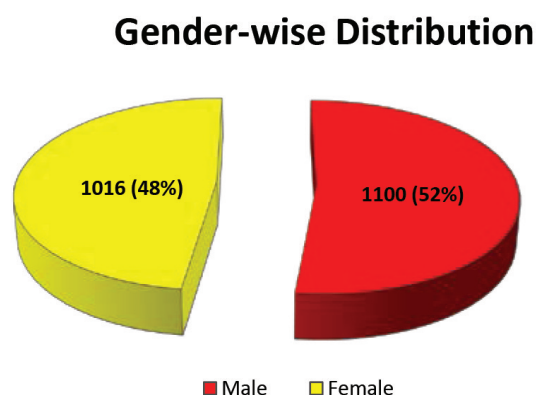


Figure 1. Genderwise distribution of cancer patients at the Nuclear Medicine Oncology and Radiotherapy Institute Nawabshah (NORIN).

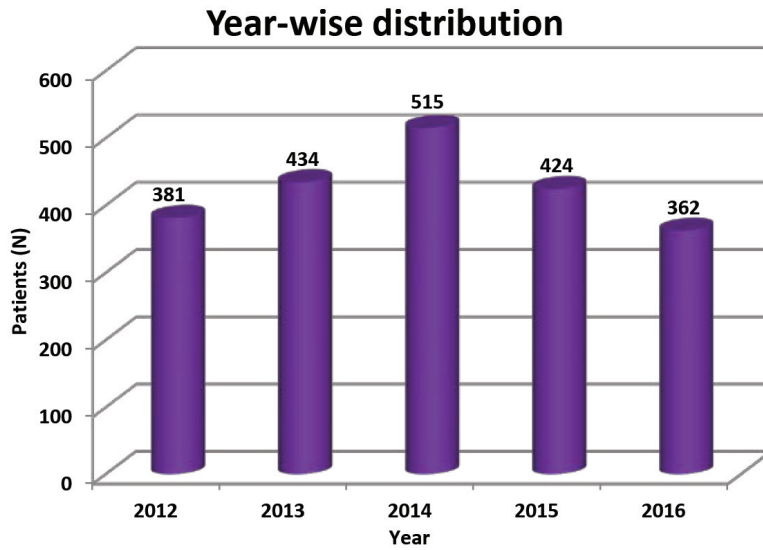


Figure 2. Numbers of patients treated in the Nuclear Medicine Oncology and Radiotherapy Institute Nawabshah (NORIN) Radiotherapy Department (2012-2016).

Possibly, the number and percentage of different cancers might vary in other areas. A total of 2116 cancer patients underwent irradiation by the cobalt-60 machine during this period. There were 1100 (52%) male patients and 1016 (48%) female patients (Figure 1). Figure 2 shows the year-wise distribution and data.

In general, the most common malignancies in terms of age-standardized rates in males were oral cavity and lung.⁸⁻¹⁰ In female patients, breast cancer was also reported to be the highest⁹ and in

other reports from throughout the country.¹¹ In NORIN, we noted that head and neck cancers in males and breast cancer in females were the top malignancies. The 2116 treated patients had the following cancer distributions: 37% (head and neck), 11% (breast), 6% (lungs), 6% (urinary bladder), 11% (CNS), 6% (esophagus), 4% (prostate), 4% (rectum/anus), 9% (cervix/uterus and vulva), and 6% (other malignancies). Figure 3 shows a comparison of the numbers of patients with different tumors treated in NORIN during the last 5 years.

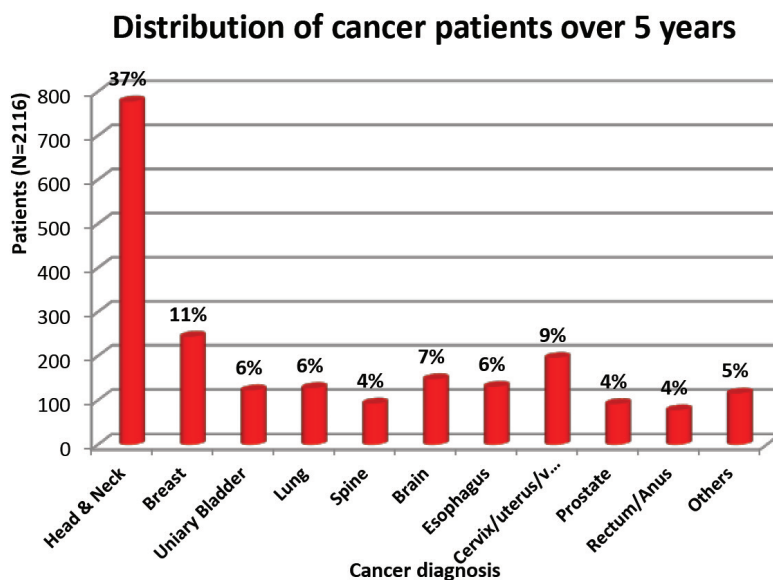


Figure 3. Distribution of cancer patients with respect to malignancy.

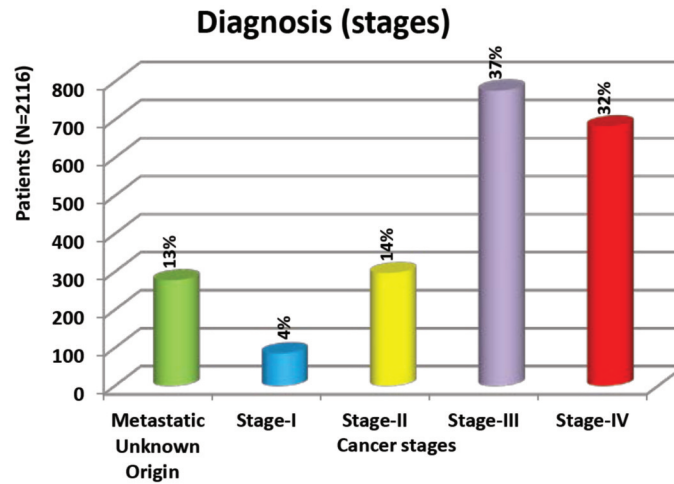


Figure 4. Patients diagnosed at different cancer stages.

Figure 4 lists the number of cases reported at different cancer stages. We noted that the number of patients diagnosed at stage III (37%) and stage IV (32%) were higher compared to patients diagnosed with stage II (14%) and stage I (5%) disease. There were 13% cases of metastatic nature of unknown origin. Most of the tumors, if detected in the early stages are curable; unfortunately, two-thirds (69%) of the cases reported during 2012-2017 had stages III or IV disease, which had spread to a distant site at the time of diagnosis. This delay contributed to a late diagnosis and higher mortality rate in cancer patients. In Pakistan, most of the cancer patients are diagnosed when they are on stage III and IV

of their disease.¹²

Patients were distributed according to their age. Overall, 68% of all cancers were found in patients 40-85 years of age according to the following distribution: 40-50 years (23%), 50-60 years (24%), and 60-85 years (21%). There were 27% of cases 20-40 years of age, 11% were 20-30 years of age, and 16% were 30-40 years of age. A total of 5% of treated cases were children.

Hanif et al. stated age-specific cancer incidence in urban area, but no study was performed on rural areas of Pakistan.¹³

Because NORIN accepts patients from different districts in rural areas of Pakistan, patients are also distributed according to the district where they

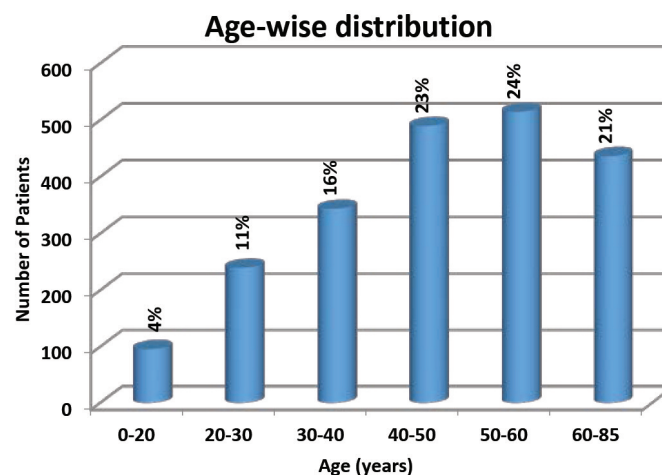


Figure 5. Agewise distribution of cancer patients (2012-2016) at the Nuclear Medicine Oncology and Radiotherapy Institute Nawabshah (NORIN).

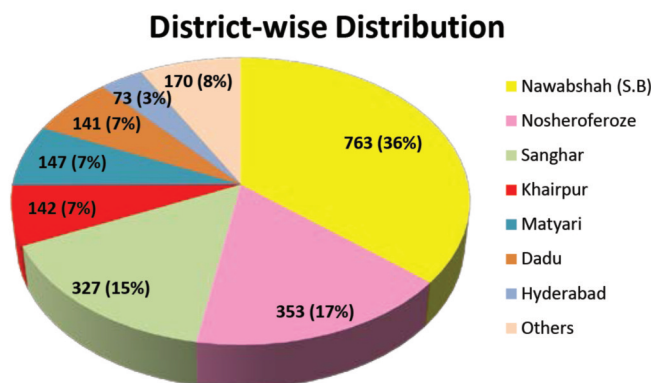


Figure 6. Districts that comprise the rural areas of Sindh, Pakistan.

reside (Figure 6). Retrospective analyses of cancer have been undertaken by the KIRAN Cancer Hospital, Karachi Jinnah Hospital, Lahore AFIP Hospital, Rawalpindi, and other radiotherapy centers in the urban areas of Pakistan.^{10,12}

Discussion

Overall, analysis of cancer patients treated in the Radiotherapy Department, NORIN with the cobalt-60 machine has shown that head and neck cancers in males and breast cancers in females were the most common. The reason for the relatively high rates of the head and neck cancers in males and breast cancers in females in Pakistan is not known, but lack of awareness and shortage of diagnostic facilities are important factors. It is concluded that largest group of patients suffering from all types of cancer lie in the age between 40 and 85. Most patients were diagnosed with stages III and IV disease which reflected a lack of awareness. A late cancer diagnosis is a serious issue in this region. Most patients refer to NORIN at later stages of the disease which makes treatment difficult. Creation of awareness and education amongst the population and the provision of diagnostic facilities in this region should be a top priority. The establishment of a cancer detection campaign and a cancer control program is vital for an efficient fight against cancer.

Acknowledgement

The authors are grateful to Mr. Junaid Faroque,

Mr. Sajad Ahmed, Ms. Andleep Naz, Ms. Farhana Baloch for their assistance and help.

Financial disclosure

The authors have nothing to disclose financially.

Conflict of interest

No conflict of interest is declared.

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