RESEARCH ARTICLE

Pattern of Pediatric Oncology Cases in the Western Region of Nepal

Pramod Kumar Yadav[1], Brijesh Sathian[2]*, Rishi Sherchan[1], Huda Fatima[3], Krishna Sharan[4], Syed Ather Hussain[3], Rachit Chawla[5], Ahmed Alsayyah[6], Alankrita Taneja[7]

Abstract

Childhood cancers form a rare and heterogeneous group which fortunately have a higher cure rate than adult cancers. A few non-profit organizations in Nepal have extended support to help patients suffering from cancer, but their main focus has been on adults. The objective of this study was to establish the pattern of childhood cancers in the Western region of Nepal. We reviewed cases receiving external radiotherapy with both palliative and curative intent between 28th September 2010 and 30th September 2015 at the Department of Radiotherapy and Oncology, Manipal Teaching Hospital affiliated with Manipal College of Medical Sciences, Pokhara, Nepal. Of the total of 1217 cases, 2.71% involved children. The gender distribution showed a male preponderance (M:F= 1.35:1). The patients' mean age was 11.4 years (range 2 - 14 years). Considering the caste, Brahmins and Gurungs constituted 33.0% and 21.2%, respectively, of children with cancer.

Keywords: Pediatric oncology- childhood cancer- Nepal

Asian Pac J Cancer Prev, **18 (12)**, 3213-3215

Introduction

Cancer is a prevailing malady and radiotherapy is a common treatment modality along with surgery and systemic chemotherapy. Of the 14.1 million new cancer cases estimated globally in the year 2012, 6.7 million cases were in developing countries alone (Garcia et al., 2007). Furthermore, there is an assumption that the developing countries will see 70% new cancer cases by the year 2020 (Jones, 1999). The population based cancer registries, which are important in evaluating the burden of the disease (Shanmugaratnam, 1991), cover only 16% of the global population. Moreover, the data from developing countries is unfortunately quite scarce as well (Parkin, 2006).

Presently there is no authentic national population based cancer registry in Nepal. However, one such registry is planned under the aegis of the World Health Organization (WHO). Every year in Nepal, approximately 1-1.5/10,000 children develop cancer out of which 1,100-1,600 are expected to be new cases (Sah et al., 2014). The objective of this study is to find out the epidemiology of childhood cancers in the Western region of Nepal.

Materials and Methods

This study utilized the data of childhood cancer cases treated with external radiotherapy between 28th September 2010 and 30th September 2015 at the Department of Radiotherapy and Oncology, Manipal Teaching Hospital (MTH), Pokhara, Nepal. MTH is a 750 bedded tertiary care hospital affiliated with Manipal College of Medical Sciences located in the Western Development Region of Nepal. Of the 1217 total cancer cases, 33 were identified as children, defined by 0-14 years of age. The frequency of different cancers according to site and other demographic features was recorded. Approval for the study was obtained from the institutional research ethical committee at the first author's institute. Data were analysed using SPSS 18.0 and EPI Info 3.5.1 windows versions using descriptive statistics and 95% confidence interval.

Results

Of the 1,217 cases treated at the aforementioned hospital, 33 (2.71%) cases were children. The gender distribution showed a male preponderance with

*[1]Department of Radiation Oncology, [2]Department of Community Medicine, Manipal College of Medical Sciences and Cancer Research Center, Pokhara, Nepal, [3]Dow Medical College, Dow University of Health Sciences, Karachi, Pakistan, [4]Department of Radiotherapy and Oncology, Kasturba Medical College – Manipal, Manipal University, Manipal, [7]Armed Forces Medical College, Pune, India, [5]St. Louis Children's Hospital, Washington University School of Medicine, St. Louis, MO, USA, [6]Department of Pathology, College of Medicine, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia. *For Correspondence: drsathian@gmail.com*

Table 1. Sub- Types of Cancer

Diagnosis	Frequency	Percent (%)	95% Confidence Interval
Acute lymphocytic leukemia	1	3	(0, 8.8)
Bladder carcinoma	2	6.1	(0, 14.3)
Nasopharyngeal carcinoma	2	6.1	(0, 14.3)
Carcinoma of the rectum	1	3	(0, 8.8)
Germ cell tumour	1	3	(0, 8.8)
Hodgkin's lymphoma	1	3	(0, 8.8)
Left parotid tumour	2	6.1	(0, 14.3)
Mediastinal tumour	2	6.1	(0, 14.3)
Medulloblastoma	3	9.1	(0, 18.9)
Pituitary adenoma	2	6.1	(0, 14.3)
Retinoblastoma	4	12.1	(1, 23.2)
Brain tumour	7	21.2	(7.3, 35.2)
Sarcoma hand	1	3	(0, 8.8)
Osteosarcoma femur	3	9.1	(0, 18.9)
Squamous cell carcinoma on the face	1	3	(0, 8.8)
Total	33	100	

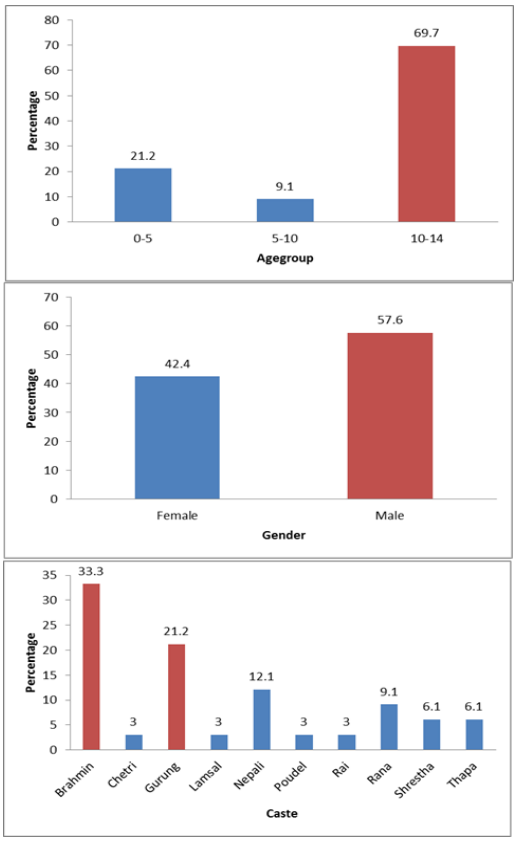

Figure 1. Socio- Demographic Wise Distribution of Cancer Cases

the male:female ratio being 1.35:1 (Figure 1). The patients' mean age was 11.39 years with a SD of 4.74 (range 2 - 14 years) (Figure 1). Brahmins constituted 33% of the patients followed by Gurungs (21.20%) (Figure 1). Table 1 depicts the distribution of patients by their diagnosis.

The pattern of radiotherapy utilization revealed that 90.9% of the patients treated with Linear Accelerator and the remaining 9.1% with Cobalt 60 machine. 69.7% of them were treated with curative intent of treatment and the remaining with palliative intent. The diagnosis of the cancers was made based on histopathology.

Discussion

Several studies have been conducted to find out the pattern of cancer in Nepal which show an increasing trend for most of the cancers in the Western region of Nepal (Kumar et al., 2015; Sathian et al., 2013; Sathian et al., 2010; Bhatt et al., 2009). In another study on the number of children with cancer presenting at Kanti Children's Hospital (KCH), Maharajgunj, Kathmandu, Nepal, Sha (2014) reported a similar pattern of the increasing trend since 1994, from 20 cases per year in 1994 to 110 cases per year at 2012. The total number of registered pediatric cancer cases in the hospital till 2012 were 1,100, out of which only 755 received treatment at their oncology unit. The various pediatric cancers treated at KCH included acute lymphoblastic leukemia, acute myeloid leukemia, non-Hodgkin's lymphoma, Hodgkin's disease, retinoblastoma, rhabdomyosarcoma, Langerhans cell histiocytosis, chronic myeloid leukemia and gastrointestinal stromal tumor which are not similiar to the findings of our study. Hematological malignancies are a very common group of childhood cancers, but they are scarce in the present cohort because most of the cases are refered to Bharatpur Cancer Hospital Bharatpur, Nepal which has a pediatric oncology unit.

Most brain tumor patients referred to KCH were managed by neurosurgeons and radiotherapists (Sah et al., 2014), which was also noted in our study. The cure rate of cancer at KCH was around 40%. 35% of patients abandoned therapy due to financial burden and 25% died during their stay in the hospital (Shah, 2004; Tiwari, 2004).

In our study, males were greater in number as compared to females. An earlier report stated that gender-differences in childhood cancer registration in developing countries exist and suggested that international differences in the incidence of childhood cancer should be interpreted cautiously as they may not necessarily reflect natural differences (Pearce et al., 2001). A recent review suggested that some of these differences might originate from exposures during prenatal development (Dorak et al., 2012).

In our study, there was a curative treatment preponderance compared to palliative intent. About 80% of children reside in low and middle-income countries (Kellie et al., 2008). The 200,000 children diagnosed with cancer each year in these countries have limited access to curative treatment, and only about 25% survive (Kellie et al., 2008). The difference in survival for children diagnosed with cancer between high and low-income countries continues to widen as curative therapies are developed in the former but not implemented in the latter (Howard et al., 2007).

Various non-governmental organizations (NGOs) have been established to improve cancer awareness and prevention in Nepal, including the Nepal Cancer

Relief Society, the Cancer Society Nepal, and Cancer Care Nepal (Nepal Cancer Relief Society, 2013). Various researchers have also carried out studies and interventional programmes regarding the awareness of cancer (Sathian et al., 2014; Joy et al., 2011; Chawla et al., 2010). Bhaktapur Cancer Hospital in Nepal has free treatment options available for orphans and poor children with cancer. In addition to this, there are a few non-profit organizations helping children with cancer in Nepal, but the focus is on treating adults with cancer because of both lower incidence as well as burden of disease in children.

In conclusion, as expected, childhood cancers constituted only 2.7% of patients receiving radiotherapy in the present cohort. However, there is poor representation of children of younger age group, as nearly 70% of patients were over 10 years of age. Majority of the patients had solid tumors. Treatment with palliative intent was delivered in 30% of patients, reflecting a more advanced stage at presentation in nearly a third of the cohort. Further studies are required to understand the discrepancies from other available literature.

Competing Interests

The authors declare that they have no competing interests. It is a self funded study.

References

Bhatt CR, Sharan K, Ninan J, et al (2009). Cancer treatment by radiotherapy in Western Nepal: a hospital-based study. *Asian Pac J Cancer Prev*, **10**, 205-8.

Chawla R, Sathian B, Mehra A, et al (2010). Awareness and assessment of risk factors for lung cancer in residents of Pokhara Valley, Nepal. *Asian Pac J Cancer Prev*, **11**, 1789-93.

Dorak MT, Karpuzoglu E (2012). Gender differences in cancer susceptibility: an inadequately addressed issue. *Front Genet*, **28**, 268.

Garcia M, Jemal A, Ward EM, et al (2007). Global cancer facts & figures American Cancer Society, Atlanta, GA. http://www.cancer.org/downloads/STT/Global_Cancer_Facts_and_Figures_2007_rev.pdf.

Howard SC, Marinoni M, Castillo L, et al (2007). Improving outcomes for children with cancer in low-income countries in Latin America: a report on the recent meetings of the Monza International School of PediatricHematology/ Oncology (MISPHO)-Part I. *Pediatr Blood Cancer*, **48**, 364-9.

Jones SB (1999). Cancer in the developing world: a call to action. *BMJ*, **319**, 505–8.

Joy T, Sathian B, Bhattarai C, et al (2011). Awareness of cervix cancer risk factors in educated youth: a cross-sectional, questionnaire based survey in India, Nepal, and Sri Lanka. *Asian Pac J Cancer Prev*, **12**, 1707-12.

Kellie SJ, Howard SC (2008). Global child health priorities: what role for paediatric oncologists?. *Eur J Cancer*, **44**, 2388-96.

Kumar A, Shrestha PR, Pun J, et al (2015). Profile of skin biopsies and patterns of skin cancer in a tertiary care center of Western Nepal. *Asian Pac J Cancer Prev*, **16**, 3403-6.

Nepal Cancer Relief Society (2013). http://www.ncrs.org.np/.

Parkin DM, Fernández LM (2006). Use of statistics to assess the global burden of breast cancer. *Breast J*, **12**, 70-80.

Pearce MS, Parker L (2001). Childhood cancer registrations in the developing world: still more boys than girls. *Int J Cancer*, **91**,402-6.

Sah KP, Arora RS, Sapkota S, et al (2014). Pediatric oncology services in Nepal. *South Asian J Cancer*, **3**, 227-8.

Sathian B, Bhatt CR, Jayadevan S, et al (2010). Prediction of cancer cases for a hospital in Nepal: a statistical modelling. *Asian Pac J Cancer Prev*, **11**, 441-5.

Sathian B, Fazil A, Sreedharan J, et al (2013). Statistical modelling and forecasting of cervix cancer cases in radiation oncology treatment: a hospital based study from Western Nepal. *Asian Pac J Cancer Prev*, **14**, 2097-100.

Sathian B, Nagaraja SB, Banerjee I, et al (2014). Awareness of breast cancer warning signs and screening methods among female residents of Pokhara valley, Nepal. *Asian Pac J Cancer Prev*, **15**, 4723-6.

Shah KP (2004). Paediatric oncology-last seven years experience at Kanti Children's hospital. *J Nepal PediatrSoc*, **24**, 92.

Shanmugaratnam (1991).Cancer registration: Principles and methods IARC scientific publication No. 95. Jensen OM et al., (Eds). Chap 1IARC, Lyon, France pp 1-2.

Tiwari PN (2004). Challenges in paediatric oncology-Last seven years experience at Kanti Children's hospital. *J Nepal Pediatr Soc*, **24**, 46.