Comparative Analysis of Cancer Incidence by Dual Cancer Registry in Nepal 2013-2015

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Abstract: Hospital based cancer registry (HBCR) program was started since 2003 in coordination with seven major hospitals in the nation with the support of WHO Nepal. Five other hospitals were also included for the study since 2013. However, population based cancer registry (PBCR) was not started until 2013. To address the need of population based cancer registry, Cancer Prevention Control and Research Department of BPKMCH initiated the population based cancer registry in 2013. Both of hospital based and population based cancer registry are running parallels since 2013. The coverage of population based cancer registry was fifteen districts of three geographical region of Nepal with 25.88% out of total population of the country. Hospital based cancer registry covered twelve major hospitals of the nation known as hospital based national cancer registry in Nepal. The present retrospective analysis of cancer patients of all age group was conducted to assess the frequency of different types of cancer presenting from first January to last December for each years of 2013, 2014 and 2015. In this study cancer incidence of each years and each registry compared separately. In the year of 2013, from hospital based incidence most common form of cancer for both sex was lung 13.2% followed by cervix uteri 9.5% and breast 8.6%. Whereas, in population based for both sexes, lung cancer 15.7% was leading cancer site followed by cervix uteri 11.0% and breast 7.6%. In the year of 2014, hospital based leading topography of cancer for both sex was lung 13.7% followed by cervix uteri 9.4% and breast 9.4%. Whereas, in population based for both sex cancer of bronchus & lung 13.7% was leading site followed by cervix uteri 10.5% and breast 9.5%. In the year of 2015, from hospital based registry bronchus & lung cancer 13.7% ranked as a first leading cancer site for both sex followed by cervix uteri 8.9% and breast 8.8%. Whereas, in population based for both sex, lung cancer 12.9% was topmost cancer site followed by cervix uteri 10.9% and breast 9.1%. The present data provide an update of the cancer burden of Nepal by double and parallel registry trend and frequency are relatively same.

Keywords: Cancer registry, Incidence, Hospital based, Population based, Topography, Nepal

1. Introduction

Cancer is an emerging public health problem in developing countries. The magnitude of the problem of cancer in terms of its large number, warrant specific attention of policymakers to evolve national programs of the action to develop, implement, coordinate and also to evaluate the cancer control activities in individual countries (Gupta et al., 1993). According to GLOBOCAN 2012, an estimated 14.1 million new cancer cases and 8.2 million cancer related deaths occurred. Compared with 12.7 million and 7.6 million, respectively in 2008 (Ferlay et al., 2012). The importance of cancer registry data for development of national cancer control programs has already been stressed in the context of South Asia (Bhurgri, 2004). In Nepal hospital based cancer registry program was started from 2003, with the support of WHO- Nepal in coordination with Seven hospitals of the nation. The programme expanded to cover 12 major hospitals in coordination with B.P. koirala Memorial Cancer Hospital Bharatpur, Chitwan. Population based cancer registry is a new to Nepalese cancer registry, We are not in a state of covering all the geographical region, province districts and population at the moment. so we decided to cover about 25.88% population and 15 districts representative of three geographical region of Nepal. To make data more homogeneous we selected district more or less in the central region of Nepal. This study includes data from fifteen districts of the country situated in Terai, hills and Himalaya. Therefore, outcome of this study can be used to infer an overall situation of cancer in Nepal.

2. Materials and Methods

In this retrospective analysis, the information of all age groups were collected from both hospital based and population based cancer registry program. Informations include name, age, sex, topography, marital status, religion, educational, occupation, and district were collected and recorded from the major diagnosis procedures i.e. histopathological, haematological and radiological as well as therapeutical procedures of cancers between 1st January to 31th December, separately by each years of 2013, 14 & 15. Collected data were coded according to ICD O 3rd and ICD-10 published by IARC/WHO and proceeds for analysis using SPSS 19.0 version.

Co-Action Institutions of Hospital Based Cancer Registry

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Figure 1: Coverage of hospital based cancer registry defined Geographical Areas of Population Based Cancer Registry. Population Based Cancer Registry, Three Geographical areas and Fifteen Districts.

Figure 2: Coverage of PBCR, 3 region, 15 districts.

Table 1: Total cases by duel registry for 2013

<table>
<thead>
<tr>
<th>Sex</th>
<th>PBCR</th>
<th>HBCR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
</tr>
<tr>
<td>Male</td>
<td>1113</td>
<td>45.1</td>
</tr>
<tr>
<td>Female</td>
<td>1356</td>
<td>54.9</td>
</tr>
<tr>
<td>Total</td>
<td>2469</td>
<td>100.0</td>
</tr>
</tbody>
</table>
### Table 2: Total cases by duel registry for 2014

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
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<td>Total</td>
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<td>100.0</td>
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</table>

### Table 3: Total cases by duel registry for 2015

<table>
<thead>
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<th>Sex</th>
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<th>HBCR</th>
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</thead>
<tbody>
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<tr>
<td>Female</td>
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### Table 4: Comparison of most prevalent cancer data from doul registry for both sex - 2013

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<th>Topography</th>
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<th>Hospital based</th>
<th>Topography</th>
<th>ICD-10</th>
</tr>
</thead>
<tbody>
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<td>C34</td>
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<td>359</td>
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<td>1156</td>
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<tr>
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<td>Cervix uteri</td>
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<td>832</td>
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<tr>
<td>C50</td>
<td>Breast</td>
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<td>752</td>
<td>8.6</td>
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<tr>
<td>C16</td>
<td>Stomach</td>
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<td>527</td>
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<tr>
<td>C56</td>
<td>Ovary</td>
<td>106</td>
<td>4.2</td>
<td>366</td>
<td>4.2</td>
</tr>
<tr>
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<td>Larynx</td>
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<td>3.8</td>
<td>350</td>
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<td>C67</td>
<td>Bladder</td>
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<td>Brain</td>
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<td>253</td>
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<td>Liver</td>
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<td>2.7</td>
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<td>Gall bladder</td>
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<td>221</td>
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### Table 5: Comparison of most prevalent cancer data from doul registry for both sex - 2014

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<th>Topography</th>
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<th>Hospital based</th>
<th>Topography</th>
<th>ICD-10</th>
</tr>
</thead>
<tbody>
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<td>13.7</td>
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<td>C53</td>
<td>Cervix uteri</td>
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<td>852</td>
<td>9.4</td>
</tr>
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<td>C50</td>
<td>Breast</td>
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<td>9.6</td>
<td>848</td>
<td>9.4</td>
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<tr>
<td>C16</td>
<td>Stomach</td>
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<td>5.4</td>
<td>528</td>
<td>5.8</td>
</tr>
<tr>
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<td>Ovary</td>
<td>123</td>
<td>4.6</td>
<td>359</td>
<td>4.0</td>
</tr>
<tr>
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<td>Gall bladder</td>
<td>110</td>
<td>4.2</td>
<td>350</td>
<td>3.9</td>
</tr>
<tr>
<td>C20</td>
<td>Rectum</td>
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<td>320</td>
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<td>Larynx</td>
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<td>3.2</td>
<td>273</td>
<td>3.0</td>
</tr>
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<td>Bladder</td>
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<td>2.9</td>
<td>238</td>
<td>2.6</td>
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<td>Brain</td>
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### Table 6: Comparison of most prevalent cancer data from doul registry for 2015

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<th>Topography</th>
<th>Population based</th>
<th>Hospital based</th>
<th>Topography</th>
<th>ICD-10</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Cervix uteri</td>
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<td>868</td>
<td>8.9</td>
</tr>
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<td>Breast</td>
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<td>856</td>
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<tr>
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<td>Stomach</td>
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<td>519</td>
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<td>365</td>
<td>3.8</td>
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<td>338</td>
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<td>Gall bladder</td>
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<td>Rectum</td>
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### Table 7: Collected data for most prevalent cancers in PBCR for both sex - 2013

<table>
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<th>#</th>
<th>%</th>
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</thead>
<tbody>
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<td>1</td>
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<td>Cervix uteri</td>
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<tr>
<td>3</td>
<td>C50</td>
<td>Breast</td>
<td>188</td>
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</tr>
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<td>4</td>
<td>C16</td>
<td>Stomach</td>
<td>138</td>
<td>5.5</td>
</tr>
<tr>
<td>5</td>
<td>C56</td>
<td>Ovary</td>
<td>106</td>
<td>4.2</td>
</tr>
<tr>
<td>6</td>
<td>C32</td>
<td>Larynx</td>
<td>94</td>
<td>3.8</td>
</tr>
<tr>
<td>7</td>
<td>C67</td>
<td>Bladder</td>
<td>93</td>
<td>3.7</td>
</tr>
<tr>
<td>8</td>
<td>C71</td>
<td>Brain</td>
<td>70</td>
<td>2.8</td>
</tr>
<tr>
<td>9</td>
<td>C22</td>
<td>Liver</td>
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<td>2.5</td>
</tr>
<tr>
<td>10</td>
<td>C23</td>
<td>Gall bladder</td>
<td>62</td>
<td>2.4</td>
</tr>
<tr>
<td>11</td>
<td>Other cancer</td>
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<td></td>
</tr>
<tr>
<td></td>
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### Table 8: Collected data for most prevalent cancers in PBCR for Male - 2013

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</thead>
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<td>Stomach</td>
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<td>C32</td>
<td>Larynx</td>
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<td>58</td>
<td>5.2</td>
</tr>
<tr>
<td>5</td>
<td>C22</td>
<td>Liver</td>
<td>36</td>
<td>3.2</td>
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<td>6</td>
<td>C15</td>
<td>Esophagus</td>
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<td>Brain</td>
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<td>C23</td>
<td>Rectum</td>
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### Table 9: Collected data for most prevalent cancers in PBCR for female - 2013

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</tr>
</thead>
<tbody>
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<td>Cervix uteri</td>
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<td>20.1</td>
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<td>2</td>
<td>C50</td>
<td>Breast</td>
<td>184</td>
<td>13.6</td>
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<td>175</td>
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<td>Ovary</td>
<td>105</td>
<td>7.7</td>
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<tr>
<td>5</td>
<td>C71</td>
<td>Brain</td>
<td>37</td>
<td>2.7</td>
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<td>6</td>
<td>C23</td>
<td>Gall bladder</td>
<td>37</td>
<td>2.7</td>
</tr>
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<td>C32</td>
<td>Larynx</td>
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<td>2.5</td>
</tr>
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<td>8</td>
<td>C67</td>
<td>Bladder</td>
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<td>2.5</td>
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### Table 10: Collected data for most prevalent cancers in PBCR for both sex - 2014

<table>
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<th>#</th>
<th>%</th>
</tr>
</thead>
<tbody>
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<td>Bronchus and lung</td>
<td>361</td>
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</tr>
<tr>
<td>2</td>
<td>C53</td>
<td>Cervix uteri</td>
<td>277</td>
<td>10.5</td>
</tr>
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<tr>
<td>4</td>
<td>C16</td>
<td>Stomach</td>
<td>144</td>
<td>5.4</td>
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<tr>
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<td>C56</td>
<td>Ovary</td>
<td>123</td>
<td>4.6</td>
</tr>
<tr>
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<td>C23</td>
<td>Gall bladder</td>
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<td>Rectum</td>
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<td>3.3</td>
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<td>Larynx</td>
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<td>C71</td>
<td>Brain</td>
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### Table 11: Collected data for most prevalent cancers in PBCR for male - 2014

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<th>%</th>
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</thead>
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<td>C16</td>
<td>Stomach</td>
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<td>7.4</td>
</tr>
<tr>
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<td>C32</td>
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### Table 12: Collected data for most prevalent cancers in PBCR for female - 2014

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<td>C22</td>
<td>Brain</td>
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### Table 13: Collected data for most prevalent cancers in PBCR for both sex - 2015

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### Table 14: Collected data for most prevalent cancers in PBCR for male - 2015

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<td>Liver and intrahepatic bile duct</td>
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Table 19: Collected data for most prevalent cancers in HBCR for both sex - 2014

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<td>Breast</td>
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Table 20: Collected Data for Prevalent Cancers in the Twelve Hospitals – Male

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<td>Larynx</td>
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Table 21: Collected data for most prevalent cancers in HBCR for female - 2014

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<td>7.0</td>
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<td>C 16</td>
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Table 22: Collected data for most prevalent cancers in HBCR for both - 2015

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Recently, it was documented that older women are also very likely to smoke, especially those with a lower socioeconomic status (Pandey and Lin, 2013). An inverse association was observed between education and lung cancer risk also observed higher the lung cancer risk among unmarried personality and lower risk in the individuals who lived in the central region compared to the west (Hashibe et al., 2011). Awareness of lung cancer by tobacco use and other risk factors varied with socioeconomic status amongst residents of Pokhara. Despite their awareness of smoking as a risk factor for lung cancer, most of them still continue to smoke (Chawla et al., 2010). Furthermore, even medical student perceptions about the cause of lung cancer may be influenced by their smoking behavior and there was little knowledge of public health measures for smoking control (Khatiwada et al., 2012).

In this study cancer of cervix uteri was the second leading cancer site for both sex and top cancer topography for female. Among females cancer of cervix uteri is a common cancer site for developing countries but in developed countries breast cancer ranked as a leading cancer. (Curado et al., 2007; Moore et al., 2010; Forman et al., 2012). There is an urgent need for a reinvigorated and tailored approach to cervix cancer prevention among the educated youth in India, Nepal and Sri Lanka (Joy et al., 2011). From this data we have found a significant increase in cancer of cervix uteri in the future, suggesting the need for more focus and resource allocation on cervical cancer screening and treatment (Sathin et al., 2013). Self-collected sampling methods should be the subject of additional research in Nepal for screening HR-HPV, associated with pre-cancer lesions and cancer, in women rural communities with limited access to health services (Johnson et al., 2014). In the context of limited screening services in Nepal, the efforts should be to reduce the diagnostic delay especially patient and health care provider delay for early detection and reduction of mortality rate of cervical cancer (Gyenwali et al., 2014). Risk factors for cancer of cervix uteri like early age a marriage, and early age at first birth, multiparity, poor genital hygiene and infection with HPV virus infection are common in Nepal. Health education programs which are effective not only in increasing knowledge about cervical cancer and pap smear test but also effective in positively changing attitude towards the test should be organized to increase pap smear coverage (Ranabhat et al., 2014).

Breast cancer was the third most common cancer for both sex and second leading cancer site in female for 2015. Cancer of breast proved to have overtaken cervical cancer in terms of incidence, as in the majority of countries of Asia (Curado et al., 2007; Moore et al., 2010; Forman et al., 2012). The fact that young Nepalese women account for over one quarter of all female breast cancers, many being diagnosed at an advanced stage (Sharma et al., 2005; Thapa et al., 2013) is of particular importance. The level of awareness of breast cancer, including knowledge of warning signs and BSE (breast self examination), is sub-optimal among Nepalese women (Sathian et al., 2014). Low knowledge on breast cancer, risk factors and screening practice among female groups (Shrestha, 2012). Community interventions have been a focus in Bangladesh (Ansink et al., 2008) and Kolkata (Basu et al., 2006) and deserve emphasis in the Nepali context. In both breast and cervical cancer prevention among the educated youth in India, Nepal and Sri Lanka (Joy et al., 2011). From this data we have found a significant increase in cancer of cervix uteri in the future, suggesting the need for more focus and resource allocation on cervical cancer screening and treatment (Sathin et al., 2013). Self-collected sampling methods should be the subject of additional research in Nepal for screening HR-HPV, associated with pre-cancer lesions and cancer, in women rural communities with limited access to health services (Johnson et al., 2014). In the context of limited screening services in Nepal, the efforts should be to reduce the diagnostic delay especially patient and health care provider delay for early detection and reduction of mortality rate of cervical cancer (Gyenwali et al., 2014). Risk factors for cancer of cervix uteri like early age a marriage, and early age at first birth, multiparity, poor genital hygiene and infection with HPV virus infection are common in Nepal. Health education programs which are effective not only in increasing knowledge about cervical cancer and pap smear test but also effective in positively changing attitude towards the test should be organized to increase pap smear coverage (Ranabhat et al., 2014).

### Table 23: Collected data for most prevalent cancers in HBCR for male - 2015

<table>
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<th>#</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>C34</td>
<td>Bronchus and lung</td>
<td>760</td>
<td>17.0</td>
</tr>
<tr>
<td>2</td>
<td>C16</td>
<td>Stomach</td>
<td>292</td>
<td>6.5</td>
</tr>
<tr>
<td>3</td>
<td>C32</td>
<td>Larynx</td>
<td>254</td>
<td>5.7</td>
</tr>
<tr>
<td>4</td>
<td>C91</td>
<td>Leukemia/lymphoid</td>
<td>182</td>
<td>4.1</td>
</tr>
<tr>
<td>5</td>
<td>C67</td>
<td>Bladder</td>
<td>159</td>
<td>3.5</td>
</tr>
<tr>
<td>6</td>
<td>C20</td>
<td>Rectum</td>
<td>150</td>
<td>3.3</td>
</tr>
<tr>
<td>7</td>
<td>C71</td>
<td>Brain</td>
<td>137</td>
<td>3.1</td>
</tr>
<tr>
<td>8</td>
<td>C85</td>
<td>NHL</td>
<td>137</td>
<td>3.1</td>
</tr>
<tr>
<td>9</td>
<td>C18</td>
<td>Colon</td>
<td>124</td>
<td>2.8</td>
</tr>
<tr>
<td>10</td>
<td>C22</td>
<td>Liver and intrhepatic bile duct</td>
<td>123</td>
<td>2.7</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Other cancers</td>
<td>2165</td>
<td>48.2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>4483</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Table 24: Collected data for most prevalent cancers in HBCR for female - 2015

<table>
<thead>
<tr>
<th>SN</th>
<th>ICD-10</th>
<th>Topography</th>
<th>#</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>C53</td>
<td>Cervix uteri</td>
<td>868</td>
<td>16.6</td>
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<tr>
<td>2</td>
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<td>Breast</td>
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<td>16.0</td>
</tr>
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<td>3</td>
<td>C34</td>
<td>Bronchus and lung</td>
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</tr>
<tr>
<td>4</td>
<td>C56</td>
<td>Ovary</td>
<td>365</td>
<td>7.0</td>
</tr>
<tr>
<td>5</td>
<td>C23</td>
<td>Gall bladder</td>
<td>235</td>
<td>4.5</td>
</tr>
<tr>
<td>6</td>
<td>C16</td>
<td>Stomach</td>
<td>227</td>
<td>4.3</td>
</tr>
<tr>
<td>7</td>
<td>C73</td>
<td>Thyroid gland</td>
<td>143</td>
<td>2.7</td>
</tr>
<tr>
<td>8</td>
<td>C20</td>
<td>Rectum</td>
<td>120</td>
<td>2.3</td>
</tr>
<tr>
<td>9</td>
<td>C71</td>
<td>Brain</td>
<td>108</td>
<td>2.1</td>
</tr>
<tr>
<td>10</td>
<td>C32</td>
<td>Larynx</td>
<td>106</td>
<td>2.0</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Other cancers</td>
<td>1651</td>
<td>31.5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>5235</td>
<td>100.0</td>
</tr>
</tbody>
</table>

3. Results

During the study period, net 27483 cases were recorded by 12 member hospitals of HBCR and 8039 were from different institutions of 15 districts and summarized in Table. Over the three years period from 1<sup>st</sup> January to December 31<sup>st</sup> in parallel registry of each calendar years, the most frequent form of cancer for both sexes was bronchus & lung followed by cervix uteri and breast. Among the female cases cervix uteri cancer was the most frequent, followed by breast and lung cancer. Similarly, bronchus & lung cancer was the most common cancer among males, followed by stomach and larynx cancer.

4. Discussion

This study was undertaken at BP Koirala memorial cancer hospital, Bharatpur, Chitwan, Nepal, Which is only national cancer institute of the nation, using secondary data of hospital based and population based cancer registry 2013-2015.

In this study, bronchus & lung cancer generally predominating in males, presumably because of smoking habits, and latter in females (Curado et al., 2007., Moor at al., 2010., Forman et al., 2012). A survey in rural communities of Nepal by Pandey et al. (1988) showed that in the 20+ years age group 85.4% of men and 62.4% of women were tobacco users. The prevalence of smoke less tobacco use, as well as smoking, is high, particularly among males and disadvantaged groups (Sinha at al., 2012). More recently, it was documented that older women are also very likely to smoke, especially those with a lower socioeconomic status (Pandey and Lin, 2013). An inverse association was observed between education and lung cancer risk also observed higher the lung cancer risk among unmarried personality and lower risk in the individuals who lived in the central region compared to the west (Hashibe et al., 2011). Awareness of lung cancer by tobacco use and other risk factors varied with socioeconomic status amongst residents of Pokhara. Despite their awareness of smoking as a risk factor for lung cancer, most of them still continue to smoke (Chawla et al., 2010). Furthermore, even medical student perceptions about the cause of lung cancer may be influenced by their smoking behavior and there was little knowledge of public health measures for smoking control (Khatiwada et al., 2012).

Breast cancer was the third most common cancer for both sex and second leading cancer site in female for 2015. Cancer of breast proved to have overtaken cervical cancer in terms of incidence, as in the majority of countries of Asia (Curado et al., 2007; Moore et al., 2010; Forman et al., 2012). The fact that young Nepalese women account for over one quarter of all female breast cancers, many being diagnosed at an advanced stage (Sharma et al., 2005; Thapa et al., 2013) is of particular importance. The level of awareness of breast cancer, including knowledge of warning signs and BSE (breast self examination), is sub-optimal among Nepalese women (Sathian et al., 2014). Low knowledge on breast cancer, risk factors and screening practice among female groups (shrestha, 2012). Community interventions have been a focus in Bangladesh (Ansink et al., 2008) and Kolkata (Basu et al., 2006) and deserve emphasis in the Nepali context. In both breast and cervical
cancer cases compliance with both screening guidelines and subsequent referral and treatment are necessary (Dinshaw et al., 2007a;2007b). It Should be noted that BSE has been validated in the Nepalese setting (Tara et al., 2008).

In conclusion, cancer of bronchus & lung was ranked as a top leading cancer site for both sex followed by cervix uteri and breast for both registry system for 2013-2015.

5. Acknowledgements

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References


[18] National Cancer Registry Programme Report of Hospital Based Cancer Registry. B.P. Koirala Memorial Cancer Hospital cancer prevention, control and research department. 2015;


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