Epidemiologic Characteristics of Top Five Cancers in Kampala, Uganda, 2009-2013

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Cancer surveillance in Uganda

- >3,000 new cases seen at Uganda Cancer Institute annually
- Over 400 health facility deaths at UCI annually
- High prevalence of cancer risk factors such as HIV, tobacco use, obesity and overweight, inadequate physical activity, among others
- Cancer surveillance coverage is <10% in Uganda
Kampala Cancer Registry (KCR)

- Started in 1954
- Collects data from hospitals, pathology laboratories, and palliative centers
- CANReg5 system (a software) used for cancer registration
Location of Kyadondo County

Burden of cancer in Kampala
Objectives

- Describe epidemiologic characteristics of top five cancers in Kampala
- Evaluate the Percentage Morphological Verification (%MV) of top five cancers in Kampala
- Make evidence-based recommendations for improvement
Data extraction and analysis

- Data from 2009-2013 extracted from KCR database
- Descriptive analysis on incidence, demographic characteristics, %MV using UBoS population figures
- Annual incidence = Number of cases \times 100000
  
  Average annual pop \times 5
- Cumulative incidence = Sum of Age specific rates per 100,000 expressed as a %
Cancer incidence among females

Annual incidence / 100,000

Cancer Type
- Cervical: 20
- Breast: 12
- Kaposi Sarcoma: 11
- Eosophagus: 3
- Ovary: 3

Burden of cancer in Kampala
Cancer incidences among Males

Incidence of top five cancers in males

Annual incidence per 100,000

- Kaposi Sarcoma: 18
- Prostate: 11
- Oesophagus: 6
- Leukemia: 3
- Liver: 3

Burden of cancer in Kampala
Cumulative incidence rate in females over 5 yrs

Cancer type

- Cervical: 6.4
- Breast: 3.7
- Kaposi Sarcoma: 1.3
- Eosophagus: 2
- Ovary: 1

Burden of cancer in Kampala
Cumulative incidence rates in males.

Cumulative incidence rate

Type of cancer

Prostate: 9.8
Oesophagus: 3.7
Kaposi Sarcoma: 2.8
Leukemia: 2
Liver: 1.3
Among females:

Cervical cancer had highest incidence
Among males:
Kaposi Sarcoma was highest among the mid age groups
Trends in incidence of top five cancers in females.

Incidence per 100,000

- Cervical
- Breast
- Kaposi Sarcoma
- Esophagus
- Ovarian

Year

2009 2010 2011 2012 2013
Trends in incidence of top five cancers in Males.

- **Kaposi Sarcoma**
- **Prostate**
- **Esophagus**
- **Leukemia**
- **Liver**
Percentage Morphological Verification (%MV)

- A measure of accuracy of cancer diagnosis
- Calculated based on basis of cancer diagnosis
- Basis of diagnosis is coded from 0 to 8
Calculation of %MV

<table>
<thead>
<tr>
<th>Code</th>
<th>Basis of diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Death certificate only</td>
</tr>
<tr>
<td>1</td>
<td>Clinical only</td>
</tr>
<tr>
<td>2</td>
<td>Ultra sound</td>
</tr>
<tr>
<td>3</td>
<td>Surgery</td>
</tr>
<tr>
<td>4</td>
<td>Lab tests</td>
</tr>
<tr>
<td>5</td>
<td>Cytology</td>
</tr>
<tr>
<td>6</td>
<td>Histology of metastasis</td>
</tr>
<tr>
<td>7</td>
<td>Histology of primary</td>
</tr>
<tr>
<td>8</td>
<td>Autopsy/Histology</td>
</tr>
</tbody>
</table>

\[
%MV = \frac{\text{Number of cases diagnosed by (Cytology + Histology + Autopsy)}}{\text{Total number of cases}}
\]
### Percentage Morphological Verification was 54.3%

<table>
<thead>
<tr>
<th>Code</th>
<th>Basis of diagnosis</th>
<th>Frequency (n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Death certificate only</td>
<td>262</td>
<td>3.2</td>
</tr>
<tr>
<td>1</td>
<td>Clinical only</td>
<td>3248</td>
<td>40</td>
</tr>
<tr>
<td>2</td>
<td>Ultra sound</td>
<td>4</td>
<td>0.1</td>
</tr>
<tr>
<td>3</td>
<td>Surgery</td>
<td>54</td>
<td>0.7</td>
</tr>
<tr>
<td>4</td>
<td>Lab tests</td>
<td>168</td>
<td>2.1</td>
</tr>
<tr>
<td>5</td>
<td>Cytology</td>
<td>82</td>
<td>1.0</td>
</tr>
<tr>
<td>6</td>
<td>Histology of metastasis</td>
<td>10</td>
<td>0.1</td>
</tr>
<tr>
<td>7</td>
<td>Histology of primary</td>
<td>4337</td>
<td>53</td>
</tr>
<tr>
<td>8</td>
<td>Autopsy/Histology</td>
<td>3</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Therefore,

\[
\%_{MV} = \frac{3 + 4337 + 10 + 82}{8168} \times 100 = 54.3\%
\]

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**Burden of cancer in Kampala**
Kaposi Sarcoma had the highest % MV

<table>
<thead>
<tr>
<th>Cancer type</th>
<th>Cervix</th>
<th>Prostate</th>
<th>Ovary</th>
<th>Breast</th>
<th>Kaposi sarcoma</th>
<th>Leukemia</th>
<th>Liver</th>
<th>Esophagus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cases</td>
<td>1120</td>
<td>263</td>
<td>74</td>
<td>384</td>
<td>1067</td>
<td>85</td>
<td>127</td>
<td>202</td>
</tr>
<tr>
<td>%MV</td>
<td>55</td>
<td>48</td>
<td>48</td>
<td>55</td>
<td>70</td>
<td>29</td>
<td>35</td>
<td>42</td>
</tr>
</tbody>
</table>
Conclusions

- Leading cancers differed by sex
  - Females: Cervical cancer
  - Males: Prostate cancer, Kaposi sarcoma

- Cancer incidence increased with age
  - Kaposi Sarcoma has high incidence rates in middle ages

- Percentage morphological verification of cancer diagnosis in registry was relatively fair
Recommendations

- Improve awareness of screenable cancers (e.g., cervical cancer, prostate, breast)
- Integration of cancer services into other health programs (e.g., HIV, MCH)
- Lobby for funding to boost cancer diagnostic capacity in all health facilities
Acknowledgment

- Ministry of Health
- US CDC
- Public Health Fellowship Program
- Kampala Cancer Registry
- Uganda Cancer Institute
- Participating Hospitals and Labs