Incidence of Primary Bone Sarcomas of Extremities in Iran (2008-2015)
A National Population-Based Study

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Introduction

• Sarcomas are heterogeneous tumors
  
  About fifty tumors; arise from mesenchymal cells

• Bone sarcomas are relatively rare
  
  0.2% in populations
  
  5- year survival rates : 55%
Introduction

- **Osteosarcoma** most prevalent primary bone sarcoma
- **Chondrosarcoma**
- **Ewing sarcoma**

- **Osteosarcoma and Ewing sarcoma** 2\textsuperscript{nd} / 3\textsuperscript{rd} decade
- **Chondrosarcoma** 5\textsuperscript{th} / 6\textsuperscript{th} decade
Epidemiology of Sarcomas in Iran

Sadighi et al. 2003
• Mean age 30 years
• Male to female 1.6/1
• Osteosarcoma
  The most common bone sarcoma in adults and pediatrics
Epidemiology of Sarcomas in Iran

Solooki et al. 2011
• Osteosarcoma
  The most common malignant bone tumor
  50.6% of malignant bone tumors

Ebrahimpour et al. 2020
• More common
  In males
  Age 15-25
• Based on Iran National Cancer Registry (INCR) data

  Incidence of bone sarcoma of the extremities
  Age and sex distribution
  Histologic type
  Location of tumor
• Population-based epidemiological study based (INCR)
  March 2008 to March 2015

• Inclusion criteria
  Primary bone sarcomas of the extremities
  Microscopically and pathologically confirmed cases derived from data registry
Exclusion Criteria

• Wrong histology subtypes
• Wrong topography codes
• Duplicate cases
  (Patients with the same first name, surname, and father’s name)
• Primary Bone sarcomas of the appendicular
  Axial skeleton
  Skull and face bones
• All histology subtypes of primary bone sarcomas
  • Osteosarcoma
  • Chondrosarcoma
  • Malignant giant cell tumor (GCT)
  • Ewing sarcoma
  • Plasmacytoma
  • Other Specified Sarcoma
    (Including fibrosarcoma, synovial sarcoma, hemangiosarcoma, neurofibrosarcoma)
  • Not Otherwise Specified (NOS)
    Undifferentiated sarcoma
Results

- 4112 patients were included
  - 2445 (59.5%) male
  - 1667 (40.5%) female
  - M>F (P<0.001)

- Osteosarcoma, chondrosarcoma, Ewing sarcoma, and plasmacytoma M>F (P<0.05)

- **Osteosarcoma**, most common histological subtypes
  - Chondrosarcoma
  - Ewing sarcoma
  - Plasmacytoma
  - NOS
  - Giant cell tumor of bone
Age

• The mean age at the time of diagnosis
  36 years
  No difference between M & F (P=0.915)
Incidence (ASIR)

• The age-standardized incidence rates per million / year

• Calculated according to
  Gender
  Year of diagnosis
  Histology subtypes
### ASIRs Based on Histological Subtypes

- **Total ASIR** 8.23 (7.98-8.49) per million person-years
- **Males** 9.67 (95% CI: 9.27-10.06)
- **Females** 6.80 (95% CI: 6.46-7.13)
- **M>F**

<table>
<thead>
<tr>
<th>Morphology Type</th>
<th>ASIR per Million Person-Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(95% Confidence Interval)</td>
</tr>
<tr>
<td>Total</td>
<td>Total</td>
</tr>
<tr>
<td>Osteosarcoma</td>
<td>2.36 (2.23-2.49)</td>
</tr>
<tr>
<td>Chondrosarcoma</td>
<td>1.26 (1.16-1.37)</td>
</tr>
<tr>
<td>Ewing Sarcoma</td>
<td>1.08 (0.99-1.17)</td>
</tr>
<tr>
<td>Giant Cell Tumor of Bone</td>
<td>0.23 (0.19-0.27)</td>
</tr>
<tr>
<td>Plasmacytoma, NOS</td>
<td>0.37 (0.31-0.43)</td>
</tr>
<tr>
<td>Others and Unspecified</td>
<td>2.92 (2.76-3.08)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8.23 (7.98-8.49)</strong></td>
</tr>
</tbody>
</table>
ASIRs Based on Topography

- **Males**
  More affected in all topography types

- **More frequent in Lower Extremities**

<table>
<thead>
<tr>
<th>Topography Type</th>
<th>Frequency (Percentage)</th>
<th>ASIR per Million (95% C.I.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Male</td>
</tr>
<tr>
<td>40.0</td>
<td>345</td>
<td>195</td>
</tr>
<tr>
<td>40.1</td>
<td>97</td>
<td>45</td>
</tr>
<tr>
<td>40.2</td>
<td>1684</td>
<td>1007</td>
</tr>
<tr>
<td>40.3</td>
<td>97</td>
<td>63</td>
</tr>
<tr>
<td>40.8</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>40.9</td>
<td>319</td>
<td>179</td>
</tr>
<tr>
<td>41.3</td>
<td>186</td>
<td>121</td>
</tr>
<tr>
<td>41.4</td>
<td>450</td>
<td>277</td>
</tr>
<tr>
<td>41.8</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>41.9</td>
<td>919</td>
<td>547</td>
</tr>
<tr>
<td>Total</td>
<td>4112</td>
<td>2445</td>
</tr>
</tbody>
</table>

11/3/2021 Adel Ebrahimpour M.D
ASIR Based on Age Group and Topography

- 60.38% of patients were between 10 to 44 years old
- Long bones of the lower limb most commonly in patients younger than 75 years

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Topography codes (C Codes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40.0</td>
<td>40.1</td>
</tr>
<tr>
<td>0-4</td>
<td>13 (0.30)</td>
</tr>
<tr>
<td>5-9</td>
<td>14 (0.33)</td>
</tr>
<tr>
<td>10-14</td>
<td>32 (0.78)</td>
</tr>
<tr>
<td>15-19</td>
<td>54 (1.15)</td>
</tr>
<tr>
<td>20-24</td>
<td>46 (0.81)</td>
</tr>
<tr>
<td>25-29</td>
<td>26 (0.45)</td>
</tr>
<tr>
<td>30-34</td>
<td>35 (0.51)</td>
</tr>
<tr>
<td>35-39</td>
<td>19 (0.48)</td>
</tr>
<tr>
<td>40-44</td>
<td>27 (0.79)</td>
</tr>
<tr>
<td>45-49</td>
<td>14 (0.49)</td>
</tr>
<tr>
<td>50-54</td>
<td>19 (0.79)</td>
</tr>
<tr>
<td>55-59</td>
<td>16 (0.87)</td>
</tr>
<tr>
<td>60-64</td>
<td>11 (0.83)</td>
</tr>
<tr>
<td>65-69</td>
<td>10 (1.04)</td>
</tr>
<tr>
<td>70-74</td>
<td>11 (1.39)</td>
</tr>
<tr>
<td>75-79</td>
<td>5 (0.82)</td>
</tr>
<tr>
<td>80-84</td>
<td>1 (0.25)</td>
</tr>
<tr>
<td>85+</td>
<td>2 (0.78)</td>
</tr>
</tbody>
</table>
ASIR of Total Bone Sarcoma 2008-2014

15-19 year

older than 55 years

0.00 5.00 10.00 15.00 20.00 25.00 30.00 35.00


Total  Male  Female
ASIR of The Most Important Histologic Subtype 2008-2014

• Osteosarcoma and Ewing sarcoma
  aged 5-14

• Chondrosarcoma
  first rank for older than 19 years
ASIR of The Most Important Histologic Subtype 2008-2014

• **Osteosarcoma** had a higher incidence rate in 2011
This finding is in line with previous studies on sarcomas in:

- Taiwan
- Japan
- United Kingdom
• Solooki et al. 1997-2008

Ewing sarcoma > Chondrosarcoma

Maybe due to different epidemiology in South part of country
ASIR of Osteosarcoma

• Iran 2.36

• Mirabello et al.
  global Female ASIR : 3.4
  global Male ASIR : 4.3

• May be due to genetic factors
ASIR of Ewing Sarcoma

• **Iran**
  Similar **UK & India**
  Higher **Taiwan**
  May due to **ethnicity**


**International variations in the incidence of childhood bone tumours**

D M Parkin, C A Stiller, J Nectoux

Affiliations + expand
PMID: 8428791 DOI: 10.1002/ijc.2910530305
• Increasing trend in the incidence of **bone sarcomas** in Iran

  **Osteosarcoma and Ewing Sarcoma**

• Similar to studies **Japan & Taiwan**
Limitations

• No survival evaluation (essential aspect of epidemiological studies)

• No data regarding after 2015 (may have different epidemiological features)
Conclusion

We found an increasing trend in the incidence of bone sarcomas, especially osteosarcoma and Ewing sarcoma.