



## Epidemiology of Osteosarcoma : Single Center Study in Indonesia

David Kalim\*, Andriandi

Resident of Orthopaedic and Traumatology, Faculty of Medicine, Sumatera Utara University / Haji Adam Malik General Hospital, Medan, Indonesia  
Department of Orthopaedic and Traumatology, Faculty of Medicine, Sumatera Utara University / Haji Adam Malik General Hospital, Medan, Indonesia

**Abstract : Objective-** To assess osteosarcoma epidemiology in Haji Adam Malik General Hospital. **Material and Methods-** This study is a retrospective descriptive study with a cross-sectional approach. Patient with musculoskeletal tumour (especially osteosarcoma) in Haji Adam Malik Hospital from January 2012 to Desember 2017 period, got their age, gender, musculoskeletal tumour type, biopsy result, tumour sites, treatment completion, metastasis and amputation status recorded from their medical record. **Result-**Primary bone tumors is the most cases and found in 50% of musculoskeletal tumors followed by soft tissue tumors and metastatic bone disease. Male (60%) have slightly higher prevalence than female in (40%). The incidence of primary bone tumors shows osteosarcoma, GCT, and osteochondroma are in the top three with 63%, 13%, and 6% respectively. Specifically for osteosarcoma, male and female have 1.9 : 1 prevalence ratio. The most common sites for osteosarcoma is distal the femur (45%) and proximal tibia (29%). About 63% of patients undergo complete treatment and with 55% recorded with metastasis in the first diagnosis and amputation was performed in 89% of patients. **Conclusion-** Primary bone tumors dominate the data with 50% for musculoskeletal tumors followed by 31% soft tissue tumors and 19% metastatic bone disease. The incidence of musculoskeletal tumors shows that men are slightly higher than women in 60% and 40%. The incidence of primary bone tumors shows osteosarcoma, giant cell tumor, and osteochondroma are in the top three with 63%, 13%, and 6% respectively.

**Keywords :** Osteosarcoma, Bone Tumour, Musculoskeletal Tumour.

### Introduction

Osteosarcoma, also known as osteogenic sarcoma, is a malignant neoplasm that originates from primitive cells (poorly differentiated cells) in the long bone metaphysical area in children. Although this tumor was usually fatal, advances in treatment have dramatically improved the prognosis for this neoplasm.

Based on research conducted in South Africa, the limited epidemiological data of a primary bone tumor make orthopedic surgeons to refer to data from other countries although in some other countries the highest

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incidence of a primary bone tumor gives different results. As in America, the incidence of chondrosarcoma occupies the highest place for primary bone tumors and in the UK, osteosarcoma occupies the highest place. The incidence of osteosarcoma in all populations according to WHO is around 4-5 per 1,000,000 population. Estimated incidence of osteosarcoma increases to 8-11 per 1,000,000 population per year at the age of 15-19 years. At Cipto Mangunkusumo Hospital there were 219 cases (16.8 cases / year) in the period of 13 years (1995-2007) which was the highest number of all bone malignancies (70.59%) with the most distribution in the second decade of life.<sup>1-6</sup>.

Life expectancy of bone cancer patients reaches 60% if there has not been spread to the lungs. About 75% of patients survive until 5 years after the disease is diagnosed. The average disease is diagnosed at the age of 15 years. The incidence rate in boys is the same as girls. But at the end of adolescence this disease is more commonly found in boys. Until now the exact cause is unknown. Seeing the number of events above and the condition of the disease that requires early detection and treatment.

## Material and Methods

This study is a retrospective descriptive study with a cross-sectional approach, which aims to determine the characteristics of musculoskeletal tumor patients, especially osteosarcoma who come to the Haji Adam Malik General Hospital Medan. The sample target was patient with musculoskeletal tumour especially osteosarcoma who came to Haji Adam Malik Hospital from January 2012 to Desember 2017. The patient who met the inclusion criteria got their age, gender, musculoskeletal tumour type, biopsy result, tumour sites, treatment completion, metastasis and amputation status recorded from their medical record.

Obtained data sorted systematically on a computer-based basis. Descriptive values of the research subjects will be presented in table.

## Result

Of the total 297 musculoskeletal tumour patients recorded from January 2012 to Desember 2017 in Haji Adam Malik General Hospital, it shows that 150 patients (50%) suffer bone tumour, 90 patients (31%) soft tissue tumour and 57 (19%) was metastatic bone tumour. Based on gender, there were 161 (54%) male and 136 (46%) female patients who suffer musculoskeletal tumour. Of total 150 bone tumour patients, 90 (60%) were male and 50 (40%) were female patients.

**Table 1. Musculoskeletal Tumour Distribution Based on Types and Gender**

Musculoskeletal Tumour Distribution	Total	(%)
Tumour Type:		
Bone tumour	150	50%
Soft Tissue Tumour	90	31%
Metastatic Bone Tumour	57	19%
Gender:		
Male	161	60%
Female	136	40%

Based on bone tumour type, from 150 patients, the most case was osteosarcoma (63%) followed by Giant Cell Tumour (13%), Osteochondroma (6%) and other types such as Aneurysm Bone Cyst, Ewing Sarcoma, etc as it seen on Table.2.

**Table.2 Bone Tumour Distribution Based on Tumour Types**

Bone Tumour Distribution	Total	(%)
Osteosarcoma	94	63%
Giant Cell Tumour	19	13%
Osteochondroma	9	6%
Aneurysm Bone Cyst	7	4%
Multiple Hereditary Exotosis	5	3%
Ewing Sarcoma	4	3%
Chondrosarcoma	4	3%
Multiple Myeloma	4	3%
Simple Bone Cyst	2	1%
Osteofibrous Dysplasia	1	0,5%
Osteoid Osteoma	1	0,5%

Specifically for osteosarcoma, it occurred mostly on second decade of life, followed by third and first decade of life. First decade is the youngest group and eighth decade as the oldest group. As for the tumour sites from 95 osteosarcoma patients, distal femur was the most common site (45%), followed by proximal tibia (14%), proximal humerus (9%) and other various sites. Based on patients treatment complication, it shows that 59 patients (63%) finished their treatment regimen and 35 patients (37%) were not. Based on metastasis finding when osteosarcoma was first diagnosed, on 58 patients (55%) metastasis were occurred and on 36 other patients (45%) were not. This study also found out that as much as 84 patients (89%) were undergo amputation and other 10 patients (11%) were not.

**Table.3 Osteosarcoma Distribution Based on Decade of Life**

Decade	Total	(%)
1 <sup>st</sup>	10	11%
2 <sup>nd</sup>	47	50%
3 <sup>th</sup>	24	26%
4 <sup>th</sup>	6	6%
5 <sup>th</sup>	4	4%
6 <sup>th</sup>	1	1%
7 <sup>th</sup>	1	1%
8 <sup>th</sup>	1	1%

**Table 4. Osteosarcoma Characteristic Distribution**

Osteosarcoma Distribution	Total	(%)
Site		
Distal Femur	42	45%
Proximal Tibia	27	28%
Proximal Humerus	12	14%
Proximal Femur	8	9%
Proximal Fibula	1	1%
Pelvic	1	1%
Radius	1	1%
Treatment Completion		
Completed	59	53%
Not Completed	35	35%
Metastasis on the First Diagnosis		
Yes	58	55%
No	36	45%
Undergo Amputation		
Yes	84	89%
No	10	11%

## Discussion

Primary bone tumors dominate the data with 50% for musculoskeletal tumors followed by 31% soft tissue tumors and 19% metastatic bone disease. The incidence of musculoskeletal tumors shows that male (60%) are slightly higher than female in (40%). The incidence of primary bone tumors shows osteosarcoma, giant cell tumor, and osteochondroma are in the top three with 63%, 13%, and 6% respectively. Specifically for osteosarcoma, the prevalence is greater among male by 65% to 35% with a ratio of 1.9: 1. In age distribution, 2<sup>nd</sup> decade of life is the highest prevalence followed by the 3<sup>rd</sup> decade and the 1<sup>st</sup> decade respectively. The most common location for osteosarcoma is distal the femur (45%) and proximal tibia (29%). About 63% of patients undergo complete treatment and with 55% recorded with metastasis in the first diagnosis. Amputation was performed in 89% of patients.

## Conclusion

Primary bone tumors dominate the data with 50% for musculoskeletal tumors followed by 31% soft tissue tumors and 19% metastatic bone disease. The incidence of musculoskeletal tumors shows that men are slightly higher than women in 60% and 40%. The incidence of primary bone tumors shows osteosarcoma, giant cell tumor, and osteochondroma are in the top three with 63%, 13%, and 6% respectively. Specifically for osteosarcoma, the prevalence is greater among male sexes by 65% to 35% with a ratio of 1.9: 1. Age prevalence is the 2<sup>nd</sup> decade of life followed by the 3<sup>rd</sup> decade and the 1<sup>st</sup> decade respectively. The most common location for osteosarcomas is found distal to the femur and proximal tibia in 45% and 29%. About 63% of patients undergo complete treatment and with 55% recorded experiencing metastasis. Amputation was performed in 89% of patients.

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