

## ORIGINAL ARTICLE

## MUSCULOSKELETAL TUMORS AT ADDIS ABABA UNIVERSITY, ETHIOPIA: A 21 YEAR ANALYSIS AT THE ORTHOPAEDIC CENTER, TIKUR ANBESA SPECIALIZED HOSPITAL

Biruk Lambisso Wamisho, MD, FCS<sup>1</sup>, Amanuel Leulseged Wolde, MD<sup>2\*</sup>

### ABSTRACT

**Introduction:** The burden of cancer is on the rise, according to WHO's report the number of new cases is said to increase by about 70% over the next two decades. Musculoskeletal tumors refer to abnormal growths involving bone and the surrounding soft tissues. In Ethiopia, like that of rest of sub-Saharan nations estimates for the incidence of musculoskeletal tumors is increasing.

**Objective:** This study aims to show the stages of presentation and overall burden of musculoskeletal tumor cases seen at Tikur Anbessa Specialized Hospital Orthopaedic center from 1989 G.C up to 2009 G.C.

**Methods:** The source of information is the Orthopedic Center at Tikur Anbessa Specialized Hospital which is the Country's largest and major diagnostic and treatment center for musculoskeletal tumors. The patients demographics and selected variables are recorded from their medical records onto Ms.Excel and then analyzed using IBM SPSS(V.24). The database spans from 1989 G.C up to 2009 G.C

**Result:** There is a trend of rising case numbers, from less than ten cases in 1989 to more than a 100 cases per year in 2007 and 2008 each. Overall, the leading musculoskeletal tumors are soft tissue sarcomas at 66.3% followed by Osteosarcoma 18.5% which is the leading primary bone tumor in the study duration.

**Conclusion:** There is a need for establishing or strengthening population-based Musculoskeletal tumor registry in the whole of Ethiopia to implement executive and evidence-based national and regional cancer control programs.

**Key Words:** Musculoskeletal Tumors, Tumor Burden, Bone tumors in Ethiopia

### INTRODUCTION

According to a systematic analysis from the global burden of disease cancer collaboration, cancer is already the second leading cause of death worldwide. In 2015 there were 17.5 million cancer cases worldwide and 8.7 million deaths. The number of cases also increased by 33% between 2005 and 2015, which was seen to correlate with mainly the aging population and population growth.(1)

Although the trend in mortality has shown some decline in the developed world, there has been an increase in mortality in the developing nations, predominantly the Sub-Saharan Africa region including Ethiopia. The shortage of resources to establish state of the art treatment centers and inadequacy of activities directed at prevention strategies have led to poor outcomes. (1-5)

Musculoskeletal tumors refer to abnormal growths involving bone and the surrounding soft tissues. These are classified based on their nature as benign or malignant.

While benign bone tumors occur more frequently than the malignant bone tumors, malignant tumors are associated with high mortality and morbidity.(6) The tumors could arise primarily from the bone, cartilage, or soft tissues in the extremities or they could be secondary deposits more commonly found in bone of the extremities. Common origins for Secondaries include thyroid, lung, renal, gastrointestinal, breast, and prostate cancer.(6)

Although Statistics show bone tumors to be relatively less common when compared to the leading causes of cancer like lung cancer and breast cancer (6); the precise incidence of musculoskeletal tumors remains largely unknown in this part of the world. This could be due to the fact that many of the patients don't present to the hospital or present late due to lack of awareness about the disease, poverty, social, religious, traditional beliefs, practices by bone setters among the population and fear of reconstructive surgeries like amputation. At the institution level lack of expertise, equipment, and proper records keeping may be the responsible factors. (7,8)

<sup>1</sup> Associate Professor, Orthopedic Center, Tikur Anbessa Specialized Hospital, AAU, Addis Abeba, Ethiopia.

<sup>2</sup> Orthopedic Surgery resident, PGY 3, Orthopedic Center, Tikur Anbessa Specialized Hospital, AAU, Addis Abeba, Ethiopia.

\*Corresponding Author E-mail: amanuel.leulseged@aau.edu.et

Treating these tumors requires the coordinated efforts of an orthopaedic surgeon, radiologist, pathologist, radiation oncologist, and medical oncologist to address the spectrum of musculoskeletal tumors.(9) This poses huge challenge for developing nations where resources are scarce, professional personnel are limited and majority of cases are late presenters and have complications. In Ethiopia, like that of rest of sub-Saharan nations estimates for the incidence of musculoskeletal tumors is increasing; Bone tumors and tumor-like lesions have been found to occur mainly between the first and fourth decades of life. It is therefore clear that these tumors have a potentially devastating effect on the most productive segment of the population; (7,8,10,11)hence, there is need to allocate more health resources toward prevention, diagnosis, and treatment of these tumors as the most tumors have a better prognosis when diagnosed and treated earlier.

### Objective

The objective of this study was to review the burden of musculoskeletal tumor cases seen in the 21 years between 1989 up to 2009 at the Orthopaedic center in Tikur Anbessa Specialized hospital, Addis Abeba University, the largest referral center in Ethiopia. It evaluates the various histological types along with their relative frequency with respect to age, gender and geographical distribution. This study is believed to fill the epidemiology data gap on musculoskeletal tumors within the specified time period.

## PATIENTS AND METHODS

### Methods: -

#### Source of Data: -

The source of information is the Orthopedic Center at Tikur Anbessa Specialized Hospital which is the Country's largest and major diagnostic and treatment center for musculoskeletal tumors.

### Data collection and Analysis

The patients demographics and selected variables are recorded from their medical records onto Ms.Excel and then analyzed using IBM SPSS (V.24). The database spans from 1989 G.C upto 2009 G.C.

### Variables

The following variables were included.

1. Demographic Data: name, sex, residential address/Region/
2. Tumor-Related Data: date of diagnosis, actual diagnosis, Stage of disease
3. Source of information: Hospital number

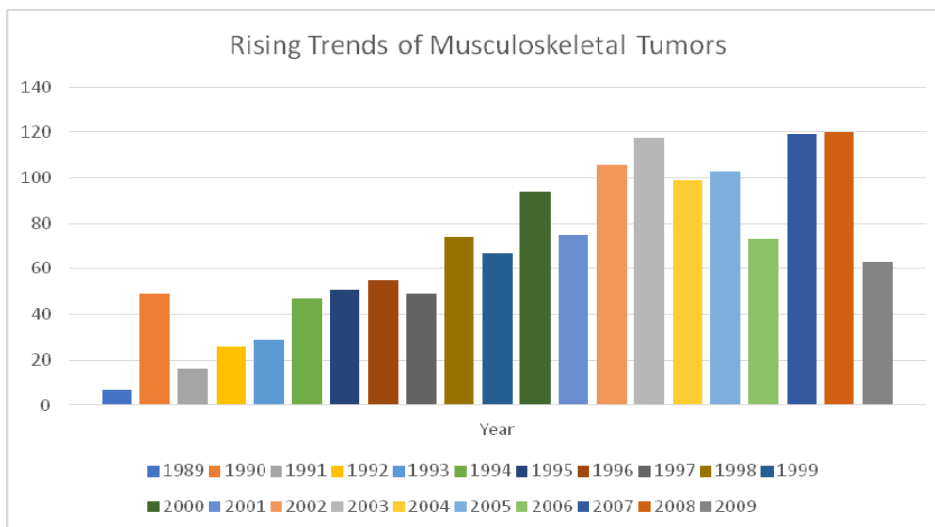
### Inclusion and exclusion criteria for the registration

In this study hematologic malignancy cases are excluded.

## RESULTS

### 1. Frequency

In this study a total of 1,424 cases have been registered excluding those with leukemia. Among these cases the majority were male 57% (809) and females account for the 43% (615). There is a trend of rising case numbers, from less than ten cases in 1989 to more than a 100 cases per year in 2007 and 2008 each.



The mean age at diagnosis was 35, with age ranging from 3 to 95. *Soft tissue sarcomas* are the most common diagnosis in this 21 year period, accounting for 66.3% of the cases seen.

During this 21 year period the majority of cases seen were from *Addis Abeba* 36.3% followed by the *Oromia region* 29.1%.

**Table1:-** Case distribution across the different regions of the country

Address	Frequency	Percentage	Population size/2008
Addis Abeba	516	36.3	3,146,999
Oromia	414	29.1	28,066,993
Amhara	224	15.7	20,136,006
Tigray	65	4.6	4,565,000
SOUTH PNNs	158	11.1	15,745,002
Somali	8	0.6	4,559,997
Afar	4	0.3	1,448,997
Gambella	4	0.3	258,999
Harari	19	1.3	209,000
Benshangul-Gumuz	2	0.1	656,000
Dire Dewa	9	0.6	428,000
Unknown	1	0.001	-
Total	1,424	100	79,221,000

Overall the leading musculoskeletal tumors are *soft tissue sarcomas at 66.3%* followed by *Osteosarcoma 18.5%* which is the leading primary bone tumor in the study duration.

**Table 2:-** The Frequency of Top five musculoskeletal tumors overall 1989 -2009 G.C

No	Diagnosis	Frequency	Percentage
1	Soft tissue sarcoma	944	66.3
2	Osteosarcoma	263	18.5
3	Ewing's Sarcoma	82	5.2
4	Chondrosarcoma	5	5
5	Multiple Myeloma	15	1

In men the leading five musculoskeletal tumors are Soft-tissue sarcomas(66.7%), osteosarcoma(19.8%), Ewing's Sarcoma(6.3%), chondrosarcoma(4.4%) and GCT(1%).

**Table 3:-**The Frequency of Top five musculoskeletal tumors in Men from 1989 -2009 G.C

No	Diagnosis	Frequency	Percentage
1	Soft tissue sarcoma	540	66.7
2	Osteosarcoma	160	19.8
3	Ewing's sarcoma	51	6.3
4	Chondrosarcoma	36	4.4
5	GCT	8	1

In women the leading five musculoskeletal tumors are Soft-tissue sarcomas(70.2%), osteosarcoma(16.8%), chondrosarcoma(5.7%), Ewing's sarcoma(5%), multiple myeloma(1.5%).

**Table 4 :-** The Frequency of Top five musculoskeletal tumors in Women from 1989 -2009 G.C

No	Diagnosis	Frequency	Percentage
1	Soft tissue sarcoma	432	70.2
2	Osteosarcoma	103	16.8
3	Chondrosarcoma	35	5.7
4	Ewing's sarcoma	31	5
5	Multiple Myeloma	9	1.5

## DISCUSSIONS

This retrospective study describes the pattern and frequencies of musculoskeletal tumors evaluated at a tertiary referral center in Ethiopia, spanning a period of more than two decades.

Musculoskeletal tumors comprise of soft tissue and bone tumors. Compared to the commonest causes of malignancy they represent less than 1% of all adult and 15% of pediatric malignancies, with an estimated annual incidence of 6,000 to 7,000 for soft tissue sarcomas and 2,750 bone sarcomas in the United States. Mortality from these tumors ranges from 30% up to 45%, highest being in those between 15 to 19 years. (6)

At the Orthopedic center in Tikur Anbessa Specialized Hospital, we have observed a trend of rising case numbers, from less than 10 cases in 1989 to more than a 100 cases per year in 2007 and 2008 each.

In this study a total of 1,424 cases have been registered excluding those with leukemia. Among these cases the majority were male 57% and females account for the 43%.

The male preponderance is similar to other studies and registries in the continent. Our male to female ratio is 1.31 slightly lower but comparable to the studies by ON Salawu et al and MM Inuwa et al who reported 1.6:1 and 1.7:1 male to female ratios respectively. (7,8,12)

The mean age at diagnosis was 35, with age ranging from 3 to 95. Soft tissue sarcomas are the most common diagnosis in this 21-year period, accounting for 66.3% of the cases seen.

During this 21-year period the majority of cases seen were from Addis Abeba 36.3%, the nation's capital, followed by the Oromia region 29.1%. Osteosarcoma is the most common primary bone sarcoma in the young and adult population, with peak in incidence between the first and second decades. It is commonly found in the metaphyseal area of bone, around the knee joint (50%) followed by the proximal humerus (25%).(6) Quite in agreement to other studies, Osteosarcoma is the leading primary bone tumor in this study comprising 18%(263) of the total number 1,424 cases. ( 7 , 8 , 1 2 , 1 3 )

In most cases of musculoskeletal tumors exact cause is unknown. Among the identified risk factors history of radiation therapy, chronic wounds and infection, having a foreign body in situ and genetic alterations can be mentioned.(6)

This study is first of its kind in highlighting the burden of musculoskeletal tumors in Ethiopia. The results have brought to light many factors.

First, the scarcity of data on one of the challenging tumors to treat i.e musculoskeletal tumors is an alarming reflection of the very limited priority these conditions are being given. In our search for literature, we have only come across three published studies related to musculoskeletal tumors in Ethiopia. All of these are from one center, Tikur Anbessa Specialized hospital. One of the major challenges is late or delayed presentations; an unpublished institutional review done at the orthopaedic center at Tikur Anbessa Specialized Hospital reveals that 83.9% of cases that present to the department are of late or advanced nature. In the study of Obafemi Joel Aina et al and other studies, late presentations in a resource limited setting result in unfavorable outcomes and pose serious challenges for managing these conditions. (7,8,14)

Therefore, a large window of opportunity exists in which delays to diagnosis and treatment can be shortened and unnecessary loss of life prevented. Reaching out to the community at large and awareness creation should be at the forefront of prevention strategies.

We also need to deal with the bottlenecks at the institutional level like;- delay in admission, long and multiple appointments, shortage of beds, lack of biopsy options, sample processing delays, weak interdepartmental collaboration, lack of an orthopedic oncology dedicated unit.

According to the UK guidelines for management of bones sarcomas, cancer control strategies should target early detection and diagnosis of symptomatic disease as one essential component of the strategy. As this will lead to improved survival outcomes and less extensive surgery.(11)

The other factor we observed was the lack of population or institution-based musculoskeletal tumor registries, which could help generate the very much needed information to guide policy making.

Major strengths of this review include it being done at the largest referral center in the country, it encompassing more than two decades of data which was collected by the efforts of the principal author. There were also some limitations. The representativeness of the review might be small as it's from a

single center and majority of patients are from closer regions and were able to travel to the tertiary center. Those in the periphery unable to travel for treatment are not included. Second, poor documentation and absence of a registry system translates to underestimation of actual number of patients seen and missing out on valuable, comprehensive data. The form of treatments they received and outcomes of these patients is also difficult to trace.

The ongoing efforts to establish an orthopedic oncology unit by training reconstructive surgeons abroad and providing CME's on musculoskeletal tumors by the orthopedic center at Tikur Anbessa specialized hospital is highly commendable and should be adopted by all orthopedic centers in the nation.

### **Conclusions**

The burden of cancer is increasing in developing countries;however Cancer in general, and musculoskeletal tumors in particular have received low priority for health care services in Sub-Saharan Africa. (1,2,4,5)

According to Tikur Anbessa specialized hospital, Orthopedic Center an unpublished review data shows that 100 tumor related surgeries are done per year, accounting for about 7% of all procedures. With the widespread practice of traditional medicine in Ethiopia, patients usually come when the tumors have reached irreversible stages. At Tikur Anbessa Specialized Hospital, Orthopedic center 83.9% of cases that present to the department are of late or advanced nature. Which is also observed in other studies and late presentations in a resource limited setting result in unfavorable outcomes and pose serious challenges for managing these conditions. (7,8,14)

This study, despite the limitation of being retrospective and not being population-based, attempts to demonstrate the wide spectrum of musculoskeletal tumors that present to Tikur Anbessa Specialized Hospital along with the statistical figures. However, the lack of a population-based bone tumor registries and reliable census figures in the nation has brought about great underestimation of incidence and prevalence of musculoskeletal tumors. According to the WHO it takes initiative and political commitment on behalf of the African nations to invest in the programs with a dedicated budget and required staff, at the same time looking for support from international public health agencies and donors to strengthen such government-based initiatives. (4)

The availability of a high-quality population-based musculoskeletal tumor registration system is an important component of any evidence-based cancer control program. Tumor registries are also useful for studying the risk factors of cancer with respect to culture, dietary patterns, and other environmental factors and the very limited prior efforts to study the causes of cancer in this population. Therefore, developing a Musculoskeletal tumor registry in the whole of Ethiopia should be given due emphasis.

### **Recommendations**

It is our belief and recommendation that having a population based Musculoskeletal tumor registry program in place nationally is of utmost importance. Due to its impact on the lives of so many, by guiding policy making to allocate resources for these conditions most of which are treatable if diagnosed early and rapid intervention instituted.

To that end the Orthopedic Center at Tikur Anbessa Specialized Hospital is ready to work with all stakeholders in the development of such registry programs across the nation.

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### **Competing of Interest**

No Conflicts of interest.

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