CYTOPATHOLOGIC PATTERNS OF SOFT TISSUE TUMOR AND ASSOCIATED FACTORS IN JIMMA UNIVERSITY MEDICAL CENTER, JIMMA, SOUTH WEST ETHIOPIA:

A 3 YEARS RETROSPECTIVE STUDIES FROM SEPTEMBER 2018 TO AUGEST 2021.

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Jimma, Ethiopia

CYTOPATHOLOGIC PATTERNS OF SOFT TISSUE TUMOR AND ASSOCIATED FACTORS IN JIMMA UNIVERSITY MEDICAL CENTER, JIMMA, SOUTH WEST ETHIOPIA: A 3 YEAR RETROSPECTIVE STUDY.

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Abstract

Background: Soft tissue tumors constitute a large and heterogeneous group of neoplasm's that arise from soft tissues that include fibrous (connective) tissue, adipose tissue, skeletal muscle, blood and lymph vessels, and peripheral nervous system. Traditionally, tumors have been classified according to histogenetic features; however, histomorphologic, immunohistochemical, and experimental data suggest that most, if not all, sarcomas arise from primitive, multipotential mesenchymal cells.

Objectives: this study is aimed at describing the cytopathologic pattern of soft tissue tumor and associated factors in Jimma university medical center from September 2018 to august 2021.

Methods: A retrospective cross-sectional study design was applied for patients seen at JUMC pathology department with soft tissue tumor who presented with soft tissue swelling from September 2018 to August 2021. Data was collected using structured check lists from the patient's FNAC report record in pathology department manually by cytopathology technicians working in the department. Data was entered into Epi data v.3.1. , cleared and exported to SPSS V.20 for analysis. Descriptive statistics such as frequency, percentage, mean was used for analysis. Finally result was presented using tables, figures and in narrative forms.

Result: A total of 767 patients were diagnosed with soft tissue tumor over the last three years with benign to malignant ratio of 11:1 and sex ratio of Male to Female 1.02:1. The most commonly diagnosed soft tissue tumor was lipoma 334(43.55%) followed by spindle cell neoplasm 256(33.37%). The age at which soft tissue tumors commonly occur was between 40-59 year categories 262(34.1%). The malignant soft tissue tumor commonly occurs in <20 year age categories 23(35.9%). The most common site of soft tissue tumor is trunk wall 253(33%) followed by lower extremities 190(24.8%). From the benign soft tissue tumor the majority (87.4%) has size of ≤5cm and only (12.6%) has size of >5cm

Conclusion: The diagnoses of benign soft tissue tumors are more frequent than malignant soft tissue tumor. In terms of age categories most benign soft tissue tumors occurs in 40-59 year (34.9%). The most common site for soft tissue tumors is trunk wall. The majority of benign soft tissue tumors have size ≤5cm while almost all malignant soft tissue tumor with size documentations have size >5cm.

Keywords: cytopathologic pattern, soft tissue tumor**.**

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First of all I would like to thanks Jimma University for giving me an opportunity to conduct the research. I extend my gratitude's to pathology department in identifying area which needs investigation and helping me to develop an action proposal.

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Abbreviation and Acronyms

FNAC	Fine needle aspiration cytology
JUMC	Jimma University Medical Centre
SST	Soft tissue tumor
WHO	world health organization
SPSS	Statistical Package for the Social Science
NOS	not otherwise specified
EPI info.	Epidemiological information
MPNST	Malignant peripheral nerve sheath tumor
DFSP	Dermatofibrosarcoma protuberans
EFMOH	Ethiopian federal ministry of health

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CHAPTER 1.Introduction

1.1 Background

Soft tissue is broadly described as the body's non-epithelial extra-skeletal structures, excluding supporting tissue of the various organs and hematopoietic/lymphoid tissue. Includes fibrous connective tissue, adipose tissue, skeletal muscle, blood and lymph vessels, and the peripheral nervous system (1).

Soft-tissue tumors are a diverse collection of tumors that develop in the soft tissues. Histogenetic characteristics have traditionally been used to classify malignancies. Nevertheless, histomorphologic, immunohistochemical, and experimental evidence suggest that most, if not all, sarcomas originate from multipotent, primitive mesenchymal cells that develop along one or more lines throughout neoplastic transformation (2).

Soft tissue tumors (as well as tumor-like abnormalities) are among the most difficult diagnoses pathologists face. It's easy to become overwhelmed by the huge range of reactive and neoplastic soft tissue diseases. Albeit the bulk of soft-tissue tumors of varied histogenetic kinds are classified as benign or malignant, many are of an intermediate nature, implying aggressive local behavior with a low-to-moderate potential for metastasis (3).

Benign tumors, which resemble normal tissue more closely, have a limited capacity for self-growth. They have a low rate of local recurrence after conservative treatment and have a low tendency to invade locally. Locally aggressive malignant tumors, or sarcomas, on the other hand, are capable of invasive or destructive growth, recurrence, and distant metastasis. To guarantee that these tumors are completely removed, appropriate oncologic surgery is required. Tumors of intermediate or borderline malignancy are known for recurring often but seldom metastasizing. (13).

Benign mesenchymal tumors outnumber sarcomas by a ratio of at least 100(2). The annual clinical incidence of benign soft tissue tumors has been estimated to be up to 3000 per million populations, but the annual clinical incidence of sentimental tissue sarcoma is roughly 50 per million people, or about 1% of all malignant tumors (but more frequent in children). There is no evidence of a shift in sarcoma incidence, nor are there any major geographical disparities.

The cause of most benign and malignant soft tissue tumors is uncertain. Genetic and environmental factors, irradiation, viral infections, and immunodeficiency have all been linked to the formation of malignant soft tissue tumors in rare circumstances. Sarcomas have also been reported in scar tissue, fracture sites, and near surgical implants in rare cases. Chronic lymphedema can lead to angiosarcomas. However, the vast majority of soft tissue sarcomas appear to develop spontaneously, with no clear cause. Some malignant mesenchymal neoplasms develop in the context of cancer syndromes that run in families. (2).

The most typical indication of a soft tissue tumor is a lump or mass. If the tumor is pressing on a nerve or muscle, a lump will appear in the location where it is growing, and it may be accompanied by pain. In the examination of STTs, FNAC is one of the initial diagnostic tools. Its function in the diagnosis of soft tissue tumors (STT) has been well-documented, but it has also been hotly contested. FNAC has recently gained prominence among its many diagnostic aids as a result of its low cost, ease of use, safety and reasonable specificity and sensetivity, particularly in terms of sorting out malignant cases. FNAC has been discovered as a valuable diagnostic tool in addition to its usage in recurring and metastatic patients (4).

The ability to identify benign from malignant soft tissue tumors using first cytological screening has been demonstrated. The claimed difficulty is appropriately sub-classify and grade the various histological entities in FNA smears is a major complaint to FNAC in the first diagnosis of soft tissue cancers. Close collaboration between cytopathologist and doctors is required for appropriate cytological assessment of soft tissue malignancies (7).

The aims of this study will be to describe the cytopathological pattern of soft tissue tumor in jimma university medical center that visited pathology department over the past three years. This investigation is that the primary in jimma university center and thus may act as baseline data for similar studies within the longer term.

1.2 Statement of the problem

Soft Tissue Sarcoma (STS) includes approximately 40 malignant histological subtypes, and around 50% is most prominent in the extremities followed by trunk and retroperitoneal and head and neck. It constitutes 1% of all adult malignancies and about 12% of pediatric cancers. Annually the incidence is about 6 per 100000 persons (14).

Despite its rarity, sarcomas are accountable for relatively high morbidity and mortality especially in children and adolescents. It is capable of invasive, locally destructive growth with a tendency to recur and metastasize. Sarcomas are more common in older patients, with 15% affecting patients younger than 15 years and 40% affecting persons older than 55 years. Accordingly, as the population ages, as it is doing at a rapid rate, the incidence of these tumors will increase (14).

Clinically STT case presents with painless mass. But benign tumors like schwannoma and glomus tumors are painful. Some benign tumors have the capacity to recur, invade locally or a potential to be converted to malignancy. Therefore, such tumors need thorough evaluation and close follow up. After surgical excision benign tumors have a very high cure rate (12).

Soft tissue sarcoma is a disease of the adult, occurring most commonly in persons between 30 and 60 years of age, except few types like embryonal, and botryoid rhabdomyosarcoma occur in young children (13).

Although clinical information regarding age, site, size of the lesions are critical for the diagnosis of STTs, but histological examination remains the cornerstone for their diagnosis. However, certain complementary methods like EM and immnunohistochemical examination (IHC) may be needed to confirm the diagnosis and to establish their classification. Moreover, Surgery and radiation therapy/chemotherapy is the mainstay of treatment options for different soft tissue tumors (13).

Therefore the objective of this study was to describe the pattern of soft tissue tumors and its associated factors in jimma university medical center.

1.3 Significance of the study

Conducting research on cytopathologic patterns of soft tissue tumor in South west Ethiopia, JUMC may provide baseline information on the topic which is scarce in the region. May help health professionals on gaining knowledge on cytopathologic patterns of soft tissue tumors and plan treatment.

The finding in this research tries to uncover the more prevalent cytopathologic patterns of soft tissue tumor that may help health planners in prioritizing their attention to the most common cytopathologic patterns. The final result will serve as baseline information for individuals who are willing to do further research on the area.

CHAPTER 2

LITERATURE REVIEW

Nonepithelial extraskeletal tissue of the body, excluding the reticuloendothelial system, glia, and supporting tissue of varied parenchymal organs are understood as soft tissue. Soft tissues like fat, muscle, nerves, fibrous tissues, blood vessels, and deep skin tissues can all grow into soft tissue tumors (11).

Soft tissue cancers are still categorized based on which cell type they resemble or were expected to resemble. Soft tissue tumors are classified as benign, malignant, or borderline malignant (intermediate malignant) tumors based on their tumor type. The goal of categorization is to group comparable tumors together in order to gain a better knowledge of tumor biology and behavior so that treatment and follow-up strategies may be developed. The study of correctly diagnosed tumors also contributes in the identification of etiology, the development of biology-based therapeutics, and may be tumor prevention (12).

It's extremely difficult to precisely estimate the incidence of soft tissue tumors, particularly the frequency of benign versus malignant tumors. Because many benign tumors, such as lipomas and hemangiomas, are not biopsyable, data from most hospital series cannot be directly applied to the general population (13).

The annual clinical incidence of benign soft tissue tumors has been estimated to be up to 3000 per million populations, but the annual clinical incidence of soft tissue sarcoma is roughly 50 per million people, or about 1% of all malignant tumors (but more frequent in children). There is no evidence of a shift in sarcoma incidence, nor are there any major geographical disparities (2).

Soft tissue sarcomas have a genesis that is poorly understood, and established causes account for only a tiny percentage of these malignancies. Ionizing radiation, oncogenic viruses, and chemicals are the most well-known etiologic causes causing soft tissue sarcomas. Although anecdotal evidence seems to support it, the role of trauma is debatable (12).

Despite their typically considerable volume, most soft tissue sarcomas of the extremities and trunk wall present as painless, incidentally noticed tumors that do not impact function or overall health. Only very seldom are clinical signs sufficient to distinguish benign from malignant soft tissue tumors. These Sarcomas are frequently misinterpreted as benign conditions due to their

benign appearance and rarity. Sarcomas are likely to be seen in all soft tissue lesions that are greater than 5 cm in diameter and all deep-seated lesions (2).

Soft tissue tumors are diagnosed using 'time-honored' histology, which is taken under consideration the 'gold standard' for evaluating them. Nevertheless, in today's world, when the "needle precedes the knife" and biopsy material is becoming scarce, it is necessary to affect the role and extent of FNAC in diagnosing STTs (4).

On aspirates, a basic cytological method to diagnosing STT begins with knowledge with normal structures, as well as myxoid or metachromatic stromal fragments and a range of dyscohesive cells such as spindly, round, pleomorphic, and polygonal those are markers of a STT (4). FNAC provides a lot of advantages over open biopsies in the diagnosis of soft tissue tumors, and it is a trustworthy approach to confirm or rule out malignancy. When patients with suspicions of primary soft tissue tumors are investigated in a multidisciplinary center with access to all relevant expertise, the best cytological results are obtained (7).

The accuracy of FNAC in discriminating benign from malignant soft tissue neoplasm's and sarcoma from other malignancies has been demonstrated to be comparable to surgical biopsies, but it has been proven to be inferior to surgical biopsies in establishing a precise subtype diagnosis (14).

Its accuracy in providing an equivocal diagnosis matches that of histopathology when applied by experienced and well-trained practitioners; therefore it could be a very valuable alternative to excision biopsy in the diagnostic workup of soft tissue malignancies. The representativeness of the sample and the excellent quality of the preparations are two important prerequisites for the success of FNAC (15).

In another study, they discovered that in malignant cases, they had a sensitivity of 84.61 percent and a specificity of 85.71 percent in terms of diagnostic efficacy (16). While the specificity was comparable to the previous study, the sensitivity was significantly lower than Rekhi et al study's which had values of 100% and 87 percent, respectively (4). However, Wakely et al. found that FNAC had 100 percent sensitivity and 97 percent specificity in diagnosing STT (17).

The accuracy of FNAC is affected by a selection of things, including poor localization of lesions, poor aspiration techniques, and tangential aspiration, during which the needle misses the tumor (15).

Modern ancillary techniques (immunocytochemistry and molecular genetics techniques), as well as the combination of FNA with other small biopsy techniques like cell-block, radiologic evaluations, and CNB, have improved the accuracy of FNAC as a useful procedure in the examination of primary soft tissue tumors (7).

According to a study conducted by Parajulis et al, 80 percent of soft tissue tumors on FNAC were benign, with lipoma accounting for 52.5 percent of cases, benign mesenchymal tumor 17.5 percent, benign fibrohistiocytic tumor 7.5 percent, tumoral calcinosis 7.5 percent, benign nerve sheath tumor 7.5 percent, benign spindle shaped tumor 7.5 percent, and benign spindle shaped tumor 7.5 percent (15).

Another study, which covered 3200 patients and was conducted at JUMC, found that there were 36 sarcomas, with 18 of them being distinct sarcomas: 6 rhabdomyosarcomas, 2 Ewing's sarcomas, 2 chondrosarcomas, 2 osteosarcomas, 2 fibrosarcomas, 2 dermatofibrosarcomas, 1 liposarcoma, and 1 angiosarcoma; nevertheless, the other 18 cases were nonspecific sarcomas, as evidenced by reports showing that an initial diagnosis of sarcomas (10).

The lower limbs were the most common site for a soft tissue tumor (106, or 39.6%), followed by the head and neck (75, or 75 percent). Soft tissue tumors have been demonstrated to have a strong relationship to the anatomic site (p value 0.001). Similarly, the lower leg was the most common site for soft tissue sarcoma, accounting for 44 (59.5%) of all cases, with the thigh accounting for 29 (39.2%), and the trunk accounting for 11%. The majority of soft tissue tumors (195/72.8%) had a diameter of less than 5 cm, with the largest tumors in the lower leg (12cm). There was also a significant association (p value 0.001) between tumor size and soft tissue tumor (8).

Lipomas account for at least 30% of benign soft tissue tumors, followed by fibrohistiocytic and fibrous tumors at 30%, vascular tumors at 10%, and nerve sheath tumors at 5%. The benign tumors are 99 percent superficial and 95 percent have a diameter of less than 5 cm. Soft tissue sarcomas can occur anywhere, although they are most common in the extremities (the thigh is the most common), with 10% each in the trunk wall and retroperitoneum (2).

So FNAC can be used in the diagnostic work-up of soft tissue tumors has a number of advantages over open biopsies and is a reliable method to confirm or exclude malignancy (7).

CHAPTER 3: OBJECTIVES

3.1. General objectives

- ✓ To describe the cytopathologic patterns of soft tissue tumors and associated factors in Jimma University Medical center from September 2018-August 2021.

3.2. Specific objectives

- ✓ To assess the pattern of soft tissue tumor in JUMC from September 2018-August 2021.
- ✓ To identify the determinant factors of soft tissue tumors in JUMC from September 2018-August 2021.

CHAPTER 4.METHODS

4.1. Study Area

Study was conducted in Jimma University Medical Center, pathology department, located in Jimma town, south western part of Ethiopia which is 352 km from the capital city of Ethiopia, Addis Ababa. JUMC has 800 beds and serves a catchment population of around 15 million populations with annual patient flow of around 200,000. The pathology department is one of the main departments of JUMC having four pathology seniors, 12 residents, and one histopathology technician, three technicians, six assistant technicians and one secretary. Services given by the pathology department of JUMC include histopathology, FNAC and Hematopathology with average 2000 biopsies, 5000 FNAC, 150 fluid cytology and 100 bone marrow aspiration service given annually.

4.2. Study Design and period

Facility based retrospective cross-sectional study design was applied from September 2018 to august 2021.

4.3. Population

4.3.1. Source population

All patients who visited jimma university medical center from September 2018 to August 2021 with soft tissue swelling

4.3.2. Study population

All patients from whom FNAC of soft tissue tumor done; from September 2018 to August 2021 fulfilling inclusion criteria

4.4. Inclusion and Exclusion criteria

4.4.1. Inclusion criteria

FNAC report records on soft tissue tumor having; Age, Sex, site, size and diagnosis

4.4.2. Exclusion criteria

- Records which missed at least two of the variables: - age, sex, site, size and cytologic diagnosis.

- Soft tissue tumor with no diagnosis and non-diagnostic yield.
- Soft tissue tumor with a diagnosis of inflammatory conditions.

4.5. Sampling technique

Conveniently, all FNAC records with soft tissue tumor on FNAC request form September 2018 to August 2021 was identified. Case fulfilling the inclusion criteria was reviewed.

4.6. Data collection procedures

Data was collected using structured check lists from the patient's FNAC report record in pathology department manually by technicians working in the department. Socio-demographics of the patients, location of the lesion, size and diagnosis was collected from patient's FNAC report records. One supervisor from junior pathology residents and three data collectors from cytopathology technician were enrolled. Training was given for data collectors and supervisor on objective of the study, data collection tools and procedures .The principal investigator supervised data collection daily.

4.7. Study variables

- Dependent variable
  - ✓ Cytopathologic diagnosis
- Independent variables
  - ✓ Age
  - ✓ Sex
  - ✓ Site
  - ✓ Size

4.8. Data processing and Analysis

Data collected by checklist which was coded edited and entered into Epi data v.3.1. , cleared and exported to SPSS V.20 for analysis and descriptive statistics such as frequency, percentage, mean was used for analysis. Cross tabulation and chi square was done to measure degree of association between variables. Result was presented using narration, tables and figures.

4.9. Data quality management

Checklist was adopted after reviewing different literatures and books. The checklist was pretested on 10% cytologic hard copy reports done in the year 2017 which were not included in the current study. The checklist was revised with some modification of the variable. Two days of training was given to the data collectors and initial data collection was accompanied by the principal investigator. The principal investigator subsequently followed and supervised the data collection. After checklist was checked for completeness, data was entered into Epi data and exported to SPSS version 20 for analysis. Covid-19 protocol was applied thought out the data collection processes.

4.10. Ethical consideration

Before the study begins ethical clearance was obtained from the Institutional Review Board (IRB) of JUMC. Permission also obtained from pathology department. Name of patient was excluded on all information obtained from patients and confidentiality was ensured. Covid-19 protocol was applied thought out the data collection processes.

4.11. Dissemination plan

The results of this study will be disseminated or communicated to the Jimma University, regional health bureau, Ethiopian federal ministry of health and other concerned bodies. Publication on an appropriate journal will also be done.

4.12 Operational definition

For better understanding of this study the following terms are defined in the context of this research.

Non diagnostic or inconclusive - A non-diagnostic soft tissue tumor is one that for qualitative and/or quantitative reasons provides insufficient diagnostic material to provide an informative interpretation.

Benign – benignity is considered after evaluations of cytological descriptions and cytomorphologically when it is less cellular with bland chromatin, absent atypical mitoses and no necrosis with additional use of clinical information's like age, duration of lesions

Malignant- malignancy is considered after evaluations of cytological descriptions and Cytomorphologically those having high cellular yields, hyperchromasia, atypical mitotic figures, necrosis with additional use of clinical information's like age, durations of lesions ,radiologic finding .

5. Result

A total of 847 request papers with the diagnosis of soft tissue tumor were reviewed in the JUMC pathology department over the last three year and 80 were excluded from the study by exclusion criteria. Soft tissue tumors contribute around 5.11% of total average 15,000 FNAC of the last three years. From the included 767 with soft tissue diagnosis 703(91.7%) were benign and 64(8.3%) were malignant with benign to malignant ratio of 11:1(figure 1).

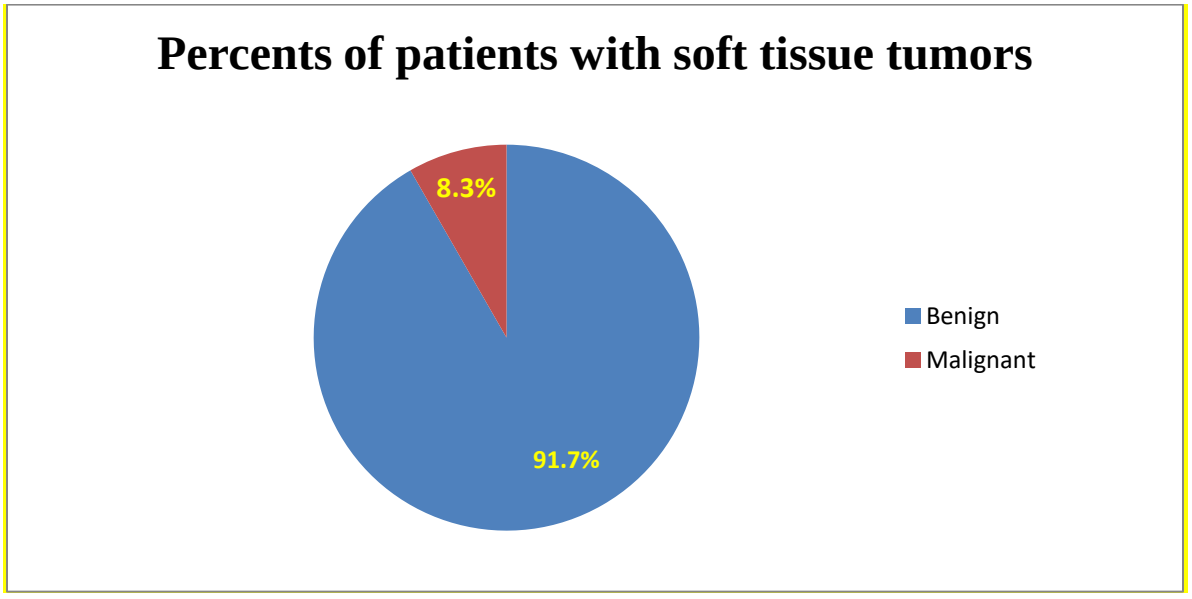

Figure 1: Major classification of soft tissue tumors from September 2018-August 2021.

From total 767 cases 388(50.6%) were male and 379(49.4%) were female with male to female ratio of 1.02:1 and there is significant associations between sex of the patients and soft tissue tumor (p value =0.003 which is p value <0.05). from the total 64 malignant soft tissue tumor 43(67.2%) occurs in female and 21(32.8%) occurs in male

The age at which soft tissue tumors commonly occur was between 40-59 year categories 262(34.1%) followed by 20-39 year categories 254(33.1) with the minimum 2 months and maximum 80 year and mean age of 34.5 year. The malignant soft tissue tumor commonly occurs in <20 year age categories 23(35.9%) and there is significant associations between the age categories and soft tissue tumor (p value=0.001) **(table 1).**

Table 1: Soft tissue tumors related socio-demographic distribution of the patients at JUMC, from September 2018-August 2021.

variable	categories	Types of tumor			Chi-square
		Benign	**Malignant**	**total**	
sex	**Male**	367(52.2%)	21(32.8%)	388	$\chi 2$=8.83 p value=0.003
	female	336(47.8%)	43(67.2%)	379	
Age (in years)	<20	163(23.2%)	23(35.9%)	186(24.3%)	$\chi 2$=18.16 p value=0.001
	20-39	242(34.4%)	12(18.7%)	254(33.1%)	
	40-59	245(34.9%)	17(26.7%)	262(34.1%)	
	≥60	53(7.5%)	12(18.7%)	65(8.5%)	

From the total 767 soft tissue diagnosis the size is only documented in 452(58.9%) and there is no documentation in the remaining 315(41.1%) cases. From 452(58.9%) soft tissue diagnosis with size documentation 293(38.2%) diagnosis have a size of 2-5cm followed by 109(14.2%) diagnosis with size of >5cm and the remaining 50(6.5%) diagnosis have <2cm. from 62 malignant soft tissue diagnosis 60(96.8%) have size >5cm.

In terms of site distributions most soft tissue tumor occurs on trunk wall 253(33%) and followed by in descending order by lower extremities 190(24.8%), head and neck 179(23.3%) and upper extremities 145(18.9%) on the other hand most malignant soft tissue tumor occurs on lower extremities 36(56.2%) followed by trunk wall 22(34.4%), head and neck 4(6.25%)and upper extremities 2(3.1%) and there is significant associations between site and soft tissue tumor (p value=0.001) **(Table 2)**

Table 2: Soft tissue tumors characteristics in terms of size and site N=767, from September 2018-August 2021.

variable	categories	Types of tumor			Chi-square
		Benign	**Malignant**	**total**	
Size (in cm.)	<2	50(12.8%)	0	50(11.1%)	
	2-5	291(74.6%)	2(3.2%)	293(64.8%)	
	>5	49(12.6%)	60(96.8%)	109(24.1%)	
Site	Head and neck	175(24.9%)	4(6.3%)	179(23.3%)	$\chi 2$=45.91 p value=0.001
	Upper extremity	143(20.3%)	2(3.1%)	145(18.9%)	
	Trunk wall	231(32.9%)	22(34.4%)	253(33%)	
	Lower extremity	154(21.9%)	36(56.2%)	190(24.8%)	

The most commonly diagnosed soft tissue tumor was lipoma 334(43.55%) followed by spindle cell neoplasm including both benign and malignant spindle cell neoplasm 256(33.37%). From spindle cell neoplasm 173(22.55%) represent benign spindle cell neoplasm whereas 46(5.99%) represent spindle cell sarcoma with few specific diagnosis of 8(1.04%) MPNST, 6(0.78%) DFSP and 4(0.52%) malignant pleomorphic sarcoma. There were 86(11.21%) diagnosis of ganglionic cyst followed by 73(9.52%) diagnosis of vascular tumors. There were also 45(5.86%) diagnosis with nerve sheath tumor including specific diagnosis of 16(2.08%) schwannoma, 14(1.82%) neurofibroma and 8(1.04%) malignant peripheral nerve sheath tumor. There were also 18(2.35%) malignant round cell sarcoma including specific diagnosis of 7(0.91%) rhabdomyosarcoma and 4(0.52%) ewing sarcoma **(figure 2).**

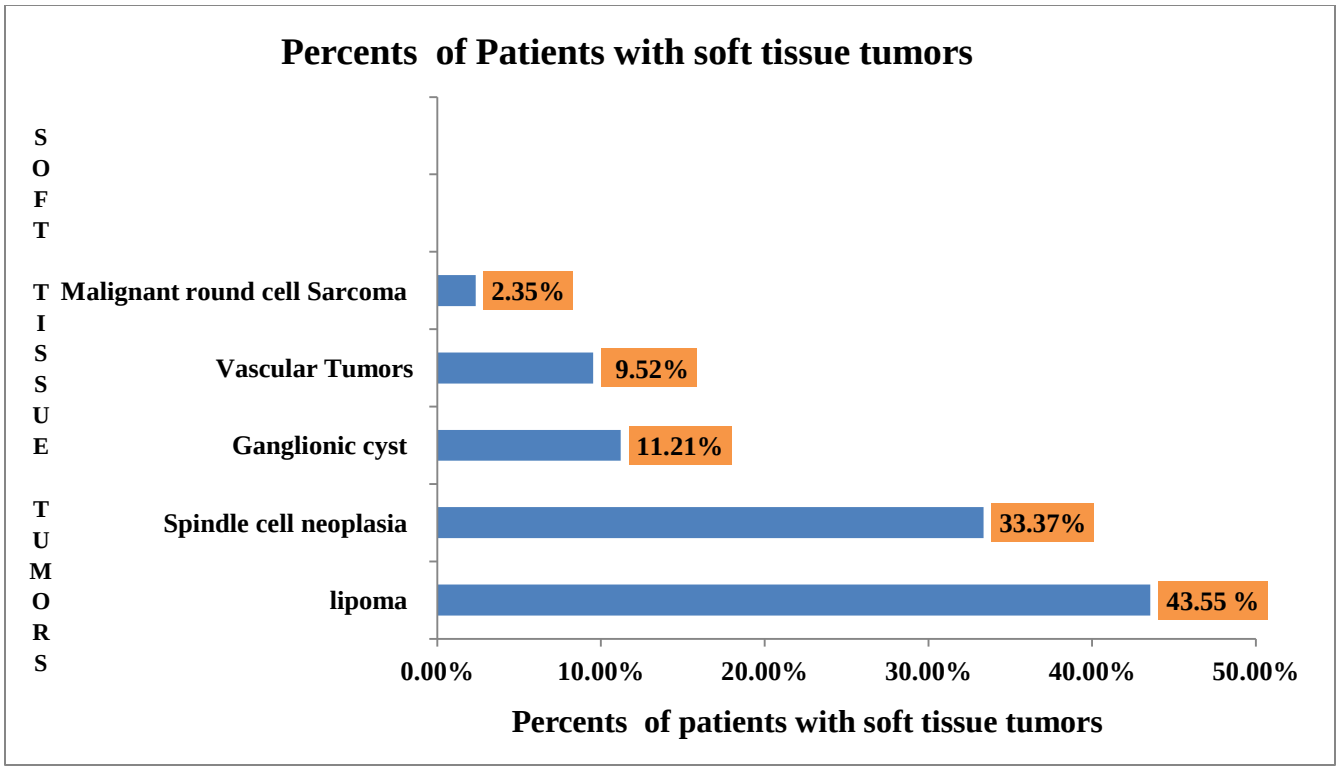

Figure 2: Sub-classification of soft tissue tumors among patients at JUMC, from September 2018-August 2021.

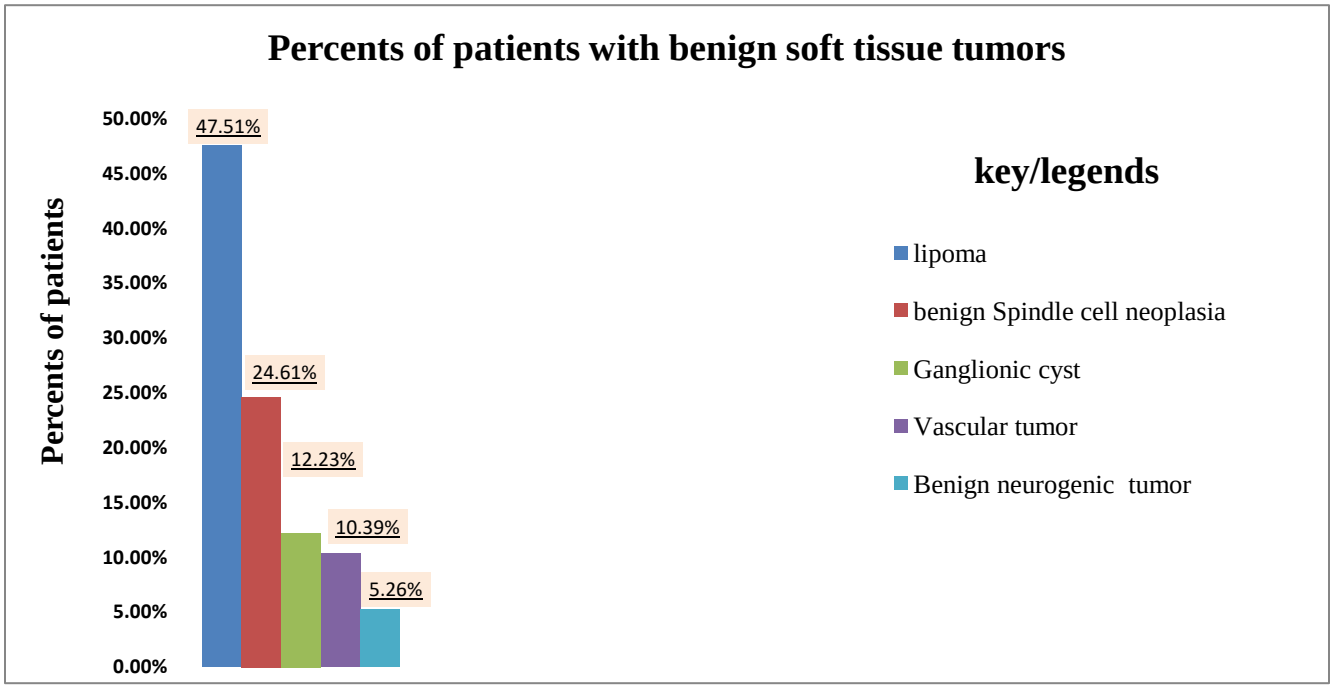

Figure 3: Sub-classification of benign soft tissue tumors at JUMC, September 2018-August 2021.

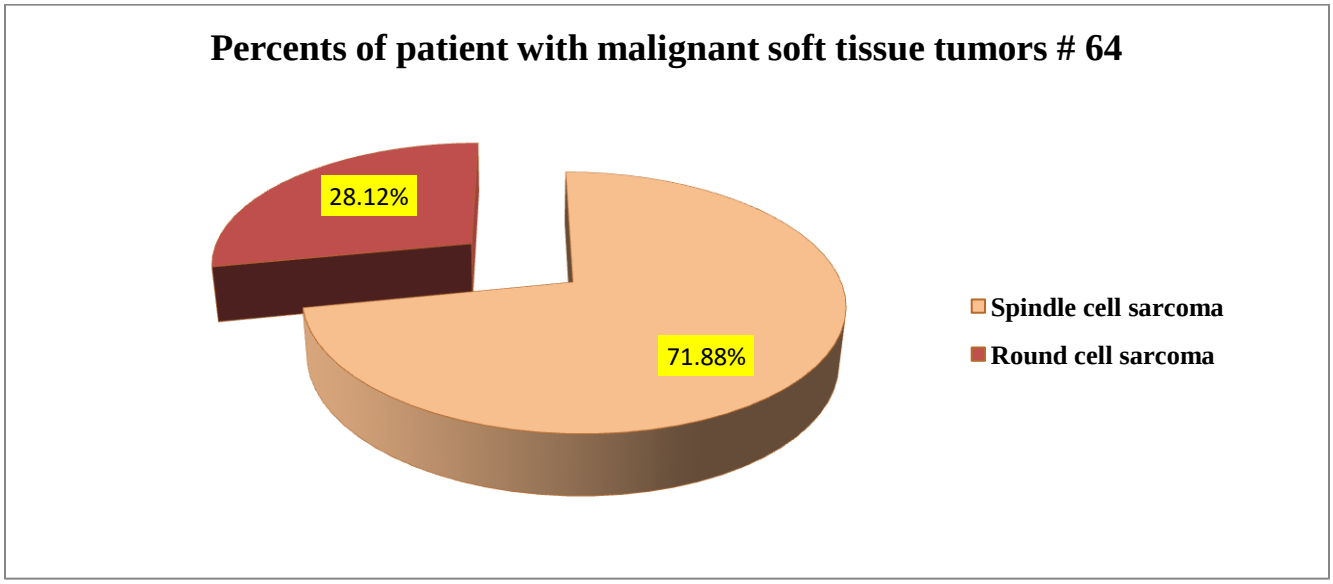

Figure 4 : Types of malignant soft tissue tumors at JUMC, From September 2018-August 2021.

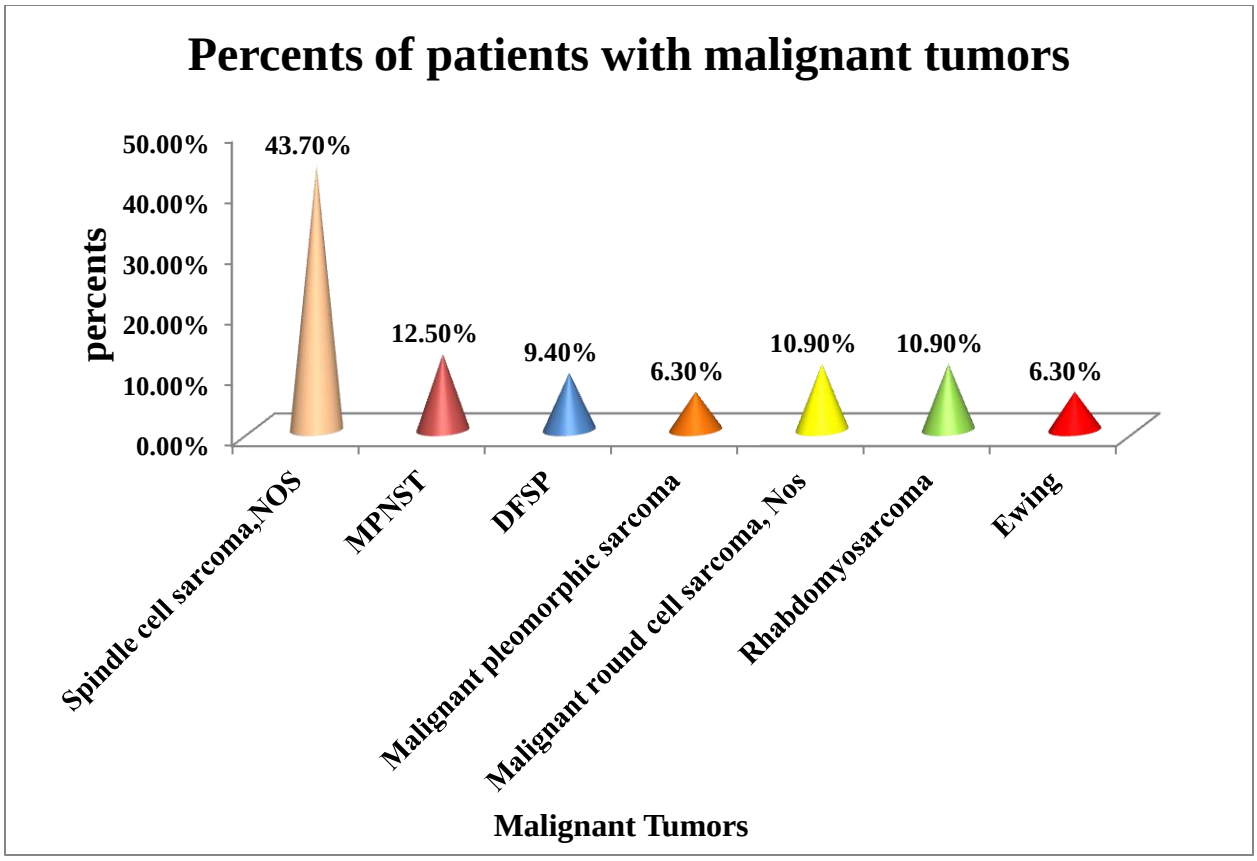

Figure 5: Sub-classification of malignant soft tissue tumors at JUMC, From September 2018-August 2021.

6.1. Discussion

In this study from the total patients diagnosed with soft tissue tumor over the last three years the majority was benign tumor(91.7%) which is predominantly Lipoma and benign spindle cell tumor whereas malignant soft tissue tumor(8.3%) diagnosis contributes much less than one tenth of the overall soft tissue diagnosis in study area. From malignant soft tissue tumor spindle cell sarcoma occurs more frequently than malignant round cell sarcoma. This study is consistent with study done in India which included 155 soft tissue diagnosis of which 139 (89.7%) were benign and 16 (10.3%) were malignant (11). Also this study is in line with study done in Addis Ababa pathology department that included 623 soft tissue diagnosis of which 516(82.8%) benign, 88 (14.1%) malignant (6).

From the total benign soft tissue diagnosis lipoma is most common diagnosis contributing about 334(47.51%) followed by benign spindle cell neoplasm 173(24.61%), ganglionic cyst 86(12.23%), vascular tumor 73(10.39%) and neurogenic tumor 37(5.26%). This finding is almost comparable with WHO classification of tumor of soft tissue and bone 2017 which describe as at least 30% of the benign tumors of soft tissue are lipomas, 10% are vascular tumors and 5% are nerve sheath tumors' (17, 11). The diagnosis of lipoma in this study is higher than WHO diagnosis and the difference may be explained by WHO study is worldwide while this study is local one.

From the total malignant soft tissue tumor spindle cell sarcoma is more frequent 71.88% followed by malignant round cell sarcoma 28.12% which is this is slightly higher in comparison to reported by other authors(21) which is may be explained by lumping of most sarcoma in to spindle cell sarcoma rather than trying for specific diagnosis.

This study shows that benign soft tissue tumor is more frequent in male(52.2%) than female(47.8%) with male to female ratio of 1.09:1 which is almost comparable with two studies which was done in India(18,19). On the other hand malignant soft tissue tumor is more frequent in female (67.2%) than male (32.8%) with female to male ratio of 2.04:1 which is in contrast with other literature(20,21). This may be due to small facility based study which may require large scale study.

In terms of age distributions this study shows that most soft tissue tumor occurs in 40-59 year categories(34.1%) followed by 20-39 year categories(33.1%). Most benign soft tissue diagnosis also occurs in these age categories (34.9%) in 40-59 year followed by (34.4%) in 20-39year almost with equal proportions making most benign soft tissue diagnosis occurs between 20-60 years.

In terms of age distributions the finding of this study is little higher than other studies which was done in Uganda, Nigeria and India(18,20,22) which may be due to delayed presentation of the patient with low health seeking behavior. In terms of malignant soft tissue tumor most occurs in <20 year categories (35.9%) followed by 40-59 year categories (26.7%) , ≥60 year categories(18.7%) and the remaining malignant soft tissue tumor occurs in 20-39 year categories(18.7%) this finding is comparable with studies done in Uganda and Nigeria in which soft tissue sarcoma were common in younger individual(20,23).

In terms of sub-classifications of malignant soft tissue tumor spindle cell sarcoma is more common in this study of which 18(39.1%) occurs in 40-59 year age category followed by 12(26%) cases in ≥60 year age category this finding is contradictory to other authors which they had reported higher age than in this finding. From malignant round cell sarcoma almost all 16(88.8%) out of 18 cases occurs in <20 year age category this is consistent with existing literature (8, 26).

In terms of site distributions most soft tissue tumors occurs on trunk wall from the total 767 cases 253(32.98%) occurs on trunk followed by lower extremities 190(24.77%), head and neck 179(23.33%) and with least frequency occurring on upper extremities 145(18.90%) this finding is comparable with study done in western India which they described (25%) of benign soft tissue tumor occurs on trunk although the finding in this study is little higher (18) in another study again in India the most common site of benign soft tissue tumor was trunk(39%)(19) which is comparable with this finding.

On the other hand the most common site of malignant soft tissue tumors in this study is lower extremities from the total 64 malignant soft tissue tumor 36(56.25%) occurs in lower extremities followed by trunk wall 22(34.4%) this finding is almost comparable with study which was done three years back at the same study area(i.e. jimma university medical center) in which the author described as the most common site for soft tissue sarcoma was lower limb (59.5%) followed by trunk(8) also in agreement with different literatures(20,23). In this study there is also significant

associations between site and soft tissue tumor (p value <0.05) which is in agreement with the study done in JUMC three year back (8).

From the total 767 soft tissue diagnosis the size is only documented in 452(58.9%) and there is no documentation in the remaining 315(41.1%) cases.

From the total 452 soft tissue diagnosis with size documentations 390(86.3%) are benign soft tissue tumor and 62(13.7%) are malignant soft tissue tumor. From the benign soft tissue tumor the majority (87.4%) has size of ≤5cm and only (12.6%) has size of >5cm which is comparable with study done in India in which they reported as majority of the benign tumors were well-circumscribed measuring less than 5 cm in size (19). From the total 62 malignant soft tissue diagnosis with size documentations the majority (96.8%) has a size >5cm while only (3.2%) has a size ≤5cm which is comparable with study done in Uganda in which (95%) of the cases were with size >5cm (20).

6.2. Limitations of the study

Since the study was done on secondary data some information was not complete.

Difficulty of finding the patients request form.

Absence of standardized sub-classifications of soft tissue tumor cytomorphologically.

Absence of immunocytochemistry on fine needle aspirate to confirm diagnosis.

7. Conclusion and recommendation

7.1 conclusions

The diagnoses of benign soft tissue tumors are more frequent than malignant soft tissue tumor. From benign soft tissue tumor lipoma was the commonest followed by benign spindle cell neoplasms.

The diagnoses of benign soft tissue tumors are slightly more frequent in males while the diagnoses of malignant soft tissue tumors are more frequent in females than in males in this study.

In terms of age categories most benign soft tissue tumors occurs in 40-59 year(34.9%) on the other hand most malignant soft tissue tumors occurs in <20 year(34.4%) category. Spindle cell sarcoma are more common in 4^{th} and 5^{th} decades while malignant round cell sarcoma are more frequent in these younger than 2^{nd} decade.

The most common site for benign soft tissue tumors in this study is trunk wall while the most common site for malignant soft tissue tumors is lower extremities.

The majority of benign soft tissue tumors have size ≤5cm while almost all malignant soft tissue tumor with size documentations have size >5cm.

7.2 Recommendation

The record keeping of our department should be improved especially on hard copies.

The necessary information of the patient should be filled appropriately like size.

Public awareness on the soft tissue tumor need to be done by concerned bodies to avoid presentations with large mass.

The sub-classifications of soft tissue tumors by FNA should have to be improved by pathologist.

The practice of immunocytochemistry on fine needle aspirate should be started.

Large scale study is recommended to assess etiology and associated risk factors of soft tissue tumor.

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ANNEX 1

Checklist

Data collection checklist to study the cytopathologic pattern of soft tissue tumor

No.	Variables		
1	year	From September 2018-August 2021	
2	FNAC No.		
3	Sex	Male	
		Female	
4	Age(years)	<20	
		20-39	
		40-59	
		≥60	
5	Size(cm)	<2	
		2-5	
		>5	
6	Site	Head and Neck	
		Upper extremities	
		Trunk wall	
		Lower extremities	
		Other(specify)	
7	Diagnosis	Benign (specify)	
		Malignant (specify)	