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The Pattern of Musculoskeletal Cancers in Pakistan

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ABSTRACT

OBJECTIVES: The objective of the study was to assess the pattern of musculoskeletal cancers in Pakistani population who visited NIMRA hospital situated at Jamshoro.

METHODOLOGY: It was an observational retrospective study, conducted at Nuclear Institute of Medicine and Radiotherapy (NIMRA) and LUMHS, Jamshoro from August 2019 to December 2020. A total of 626 patients were selected for this study. The data regarding patients were sourced from NIMRA, LUMHS Jamshoro. All the patients of both genders and the ages, who were diagnosed at NIMRA with any cancer were included in the study. Patients who did not return for follow-up after their metastatic and laboratory tests were excluded from the study. Chi-square test was conducted to assess the association between diagnosed cancers versus gender and age groups. Confidence interval was set at 95% and probability value ≤0.05, as statistically significant.

RESULTS: A total of 626 patients were selected for this study. Out of them 362 (57.8%) were males and 264 (42.2%) were females with the mean age 34.67 years and standard deviation of 18.998. The most prevalent cancer is soft-tissue sarcoma (STS) 129 (20.6%) followed by chondrosarcoma 119 (19%), and osteosarcoma 91 (14.5%). Forty percent of the cancers were being diagnosed as stage-II, followed by stage-III (22%), stage-IV (22%) and stage-I (16%) respectively. A significant association between diagnosed cancers were found with gender (p=0.001) and age group (p=<0.001).

CONCLUSION: Soft-tissue sarcoma, chondrosarcoma, and osteosarcoma are the most common musculoskeletal cancers amongst Pakistani population.

KEY WORDS: Chondrosarcoma, Ewing sarcoma, Musculoskeletal Cancers, Osteosarcoma, Rhabdomyosarcoma, Soft-tissue sarcoma.

INTRODUCTION

Musculoskeletal tumors may develop in bone or soft tissues, including muscles and cartilages.[1] They are called sarcomas when transformed into malignant for instance chondrosarcoma and osteosarcoma.[2] While musculoskeletal tumors are rare, the development of pathologic fractures is a major concern with bone tumors. The most common malignant musculoskeletal tumors in children and adolescents are rhabdomyosarcoma, Ewing sarcoma and osteosarcoma.[3]

Over the last few decades, a number of factors have led to better outcomes for these patients. Patients are enrolled in clinical trials and receive multidisciplinary treatment from oncologists, radiation oncologists, physicians, pathologists, and radiologists. Studies using molecular targets in addition to conventional chemotherapeutic agents have resulted from a greater understanding of disease molecular mechanisms, which could lead to better outcomes in the future.[4] Furthermore, modern orthopedic procedures and instruments, as well as new radiation oncology tools, hold promise for improved local management of primary tumors and the reduction of late side effects.[5]

Despite this improvement, patients must be monitored for the rest of their lives for the long-term effects of intensive chemotherapy and radiation therapy.[6] A patient with a suspected soft tissue or bone tumour should be treated at a hospital where he or she can receive multidisciplinary care.[7] Radiography, MRI, and/or CT are used to assess the primary tumor.[8] When treating a child or adolescent who has recently been diagnosed with one of these cancers, it's important to assemble a multidisciplinary team of surgeons and radiation oncologists as soon as possible so that treatment plans can move forward smoothly and local control scheduling can be organized so that chemotherapy can begin as soon as possible.[9] The objective of the study was to assess the pattern of musculoskeletal cancers in Pakistani population who visited NIMRA hospital situated at Jamshoro.

METHODOLOGY

It was an observational retrospective study, conducted at Nuclear Institute of Medicine and Radiotherapy (NIMRA) and LUMHS, Jamshoro from August 2019 to December 2020. A total of 626 patients were selected for this study. The data regarding patients were sourced from NIMRA which is a leading referral and cancer treatment public hospital that offers financial assistance for diagnosis and treatment to patients from all over Pakistan on a need-basis. All the patients of both genders and the ages, who were diagnosed at NIMRA with any cancer were included in the study. Patients who did not return for follow-up after their metastatic and laboratory tests were excluded from the study.

Demographic characteristics such as gender, patient religion, profession, language, district, name of cancers diagnosed, site of cancer, type of cancer, stage of cancer, and age group were among the study variables obtained by the principal investigator in this study.

The data was entered and analyzed using SPSS (Statistical Package for Social Sciences) version 22.0. Frequency and percentage were calculated for qualitative variables such as occupation of patient, language of patient, district of patients, site of cancer, and type of MSK cancer diagnosed while gender, religion of patient, stage of cancer and age group were presented as Pie chart or Bar chart. Quantitative data like age at diagnosis of cancer were presented as histogram. Statistical test conducted was Chi-square to assess the association between cancer diagnoses verses gender and age groups. Confidence interval was set at 95% and probability value ≤ 0.05, as statistically significant.

RESULTS

A total of 626 patients were selected for this study. Out of them 362 (57.8%) were males and 264 (42.2) were females with the mean age at the diagnosis of cancer was 34.67 years with the Standard deviation of 18.998. Regarding occupation of the patients, mostly were housewives 149 (23.8%), followed by laborer 112 (17.9%) and others. While occupational data regarding 113 patients (18.1%) was not available.

The data regarding cancers diagnosed in the patients is presented in Figure I. The most prevalent cancer is Soft-tissue sarcoma (STS) 129 (20.6%) followed by Chondrosarcoma 119 (19%), Osteosarcoma 91 (14.5%). Forty percent of the cancers were being diagnosed as stage-II, followed by stage III (22%), stage-IV (22%) and stage-I (16%) respectively (Figure II).

According to the obtained data, most of the cancer patients were aged between 21 to 40 years 219 (35%), 188 (30%) below the age of 20 years, 152 (24.3%) 41 to 60 years, 63 (10.1%) were 61 to 80 years and only 4 patients (0.6%) were above 80 years of age (Figure III). Table I shows a significant association (p=0.001) was found between gender of patients and cancer diagnosed. The association between age groups and the diagnosed cancers was also found statistically to be highly significant (p= <0.001).

FIGURE I: DISTRIBUTION OF THE CANCERS/CARCINOMAS DIAGNOSED AMONG PATIENTS

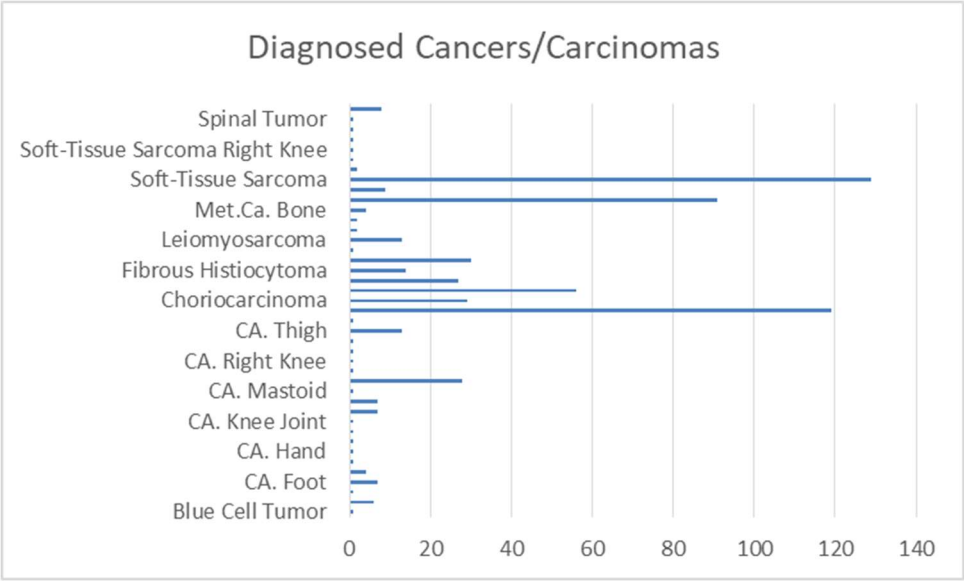

FIGURE II: DISTRIBUTION OF THE STAGES OF CANCER (n=626)

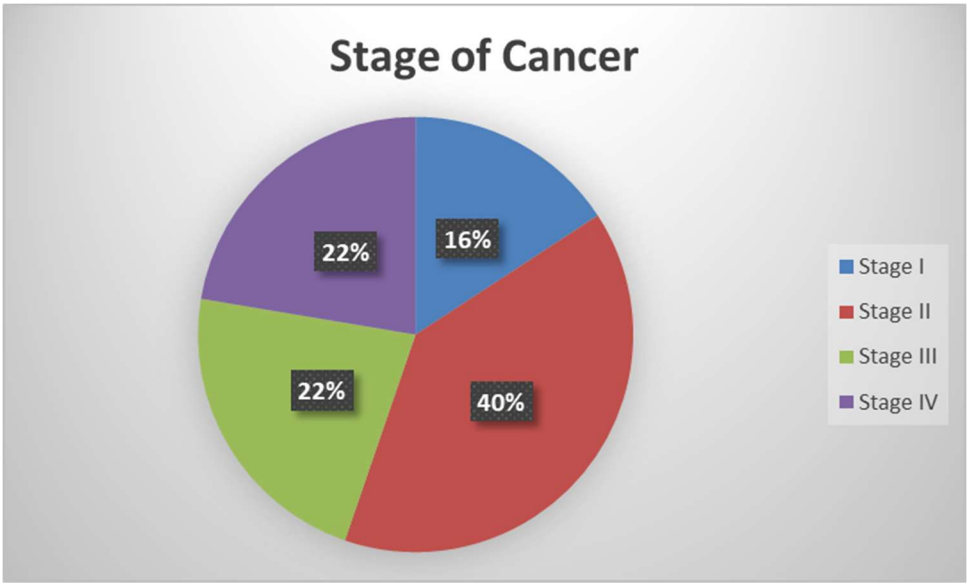

FIGURE III: DISTRIBUTION OF THE AGE GROUPS (n=626)

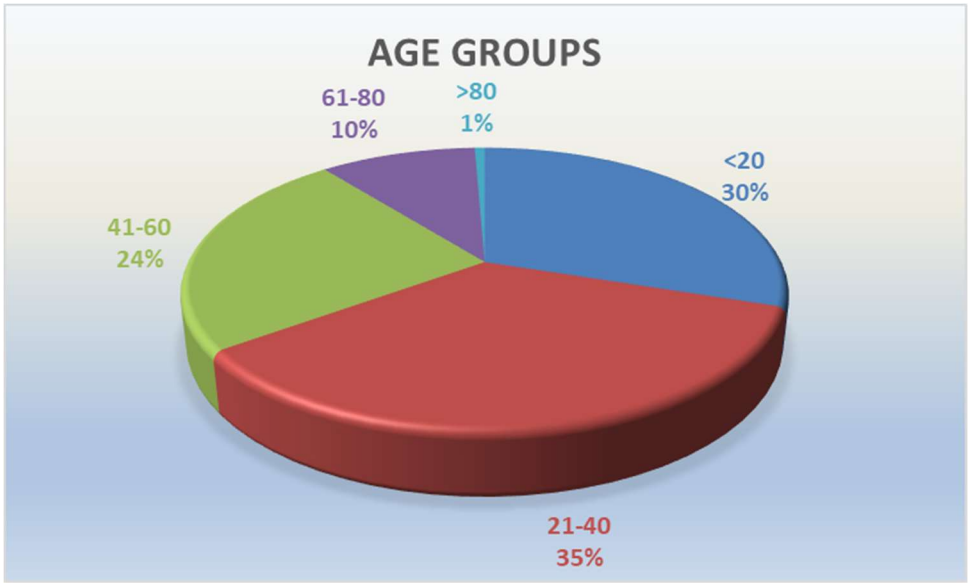

TABLE I: ASSOCIATION BETWEEN THE DIAGNOSED CANCERS AND THE GENDER N=626

Cancer Diagnosed	Gender of Patient		P-value
	Female	Male	
Blue Cell Tumor	0	1	
Bone Tumor	2	4	
CA. Arm	1	0	
CA. Foot	2	5	
CA. Forearm	0	4	
CA. Forehead	1	0	
CA. Hand	0	1	
CA. Heel	0	1	
CA. HIP	0	1	
CA. Knee Joint	0	1	
CA. Leg	3	4	
CA. Mandible	5	2	
CA. Mastoid	1	0	
CA. MAXILLA	13	15	
CA. Popliteal Fossa	0	1	
CA. Right Knee	0	1	
CA. Sacrum	0	1	
CA. Shoulder	0	1	
CA. Thigh	7	6	
CA. Tibia	1	0	
Chondrosarcoma	45	74	**0.001**
Choriocarcinoma	29	0	
Ewing Sarcoma	20	36	
Fibrosarcoma	14	13	
Fibrous Histiocytoma	4	10	
Giant Cell Tumor	11	19	
Kaposi's Sarcoma	1	0	
Leiomyosarcoma	7	6	
Liposarcoma	0	2	
Malignant Fibrous Histiolymfoma	1	1	
Met.Ca. Bone	1	3	
Osteosarcoma	38	53	
Rhabdomyosarcoma	3	6	
Soft-Tissue Sarcoma	49	80	
Soft-Tissue Sarcoma Chest Wall	1	1	
Soft-Tissue Sarcoma Forearm	0	1	
Soft-Tissue Sarcoma RIGHT KNEE	1	0	
Soft-Tissue Sarcoma THIGH	1	0	
Spinal Sarcoma	0	1	
Spinal Tumor	0	1	
Synovial Sarcoma	2	6	

DISCUSSION

This study was designed to assess the pattern of musculoskeletal cancers in Pakistan. In our study it was found that the most common musculoskeletal cancer is STS. According to the incidence (1995-7) recorded in this study, Karachi is in a high-risk area for STS, ranking 4th for males and 10th for females among the 230 contemporary registries.[10] The incidence of STS in the Kaposi sarcoma population was equivalent to that of contemporary European and US populations.[11] Males with Kaposi sarcoma had the highest incidence in Asian registries, while females with STS had the third highest incidence, after registries in Israel and Manila. The South Asian population has one of the lowest rates of STS in the world.[12] In contrast to other epidemiological studies, which display a small male predominance, the current research shows a higher male-to-female ratio while in terms of age groups it is more common amongst 21 to 40 years of patients followed by 41 to 60 years.

In present study, the second most common cancer was chondrosarcoma. Which is a cartilage cell cancer. Only 2 to 10% of all chondrosarcomas are of the mesenchymal origin. In case reports and small series, approximately 600 cases of MCS have been reported and only three series of 20 or more cases have been identified in English-language medical literature.[13] Mesenchymal chondrosarcoma has been known for 58 years, but it continues to pose diagnostic and management difficulties, owing to its rarity. To date, only a few case series have been written.[14]

The third most prevalent caner in present study found was osteosarcoma. Osteosarcoma is a malignant bone tumor that develops in the early stages of life. It's a rare cancer in adults, accounting for less than 1% of all cancers diagnosed in the US each year.[15] There is a bimodal age distribution in osteosarcoma with incidence in early adulthood and later over the age of 65.[16] In current study it is more prevalent in males as compared to females and majority of the cases are diagnosed in the patients who are below 20 years of age. We could not find a later peak in incidence that matched epidemiological data from another institute in our region.[17] The age and male preponderance, on the other hand, are related to global incidence rates.[18] The lower end of the femur and the upper end of the tibia were the most common sites of initial disease. This accounted for 79.6% of the total incidences. Concurrently, pulmonary metastasis accounted for 64% of all metastatic cases at the time of diagnosis.[19,20]

Pakistan's health and development systems are overburdened by ineffective palliative care, which is largely unknown and ignored in the country. Cancer treatment centers are concentrated in large cities, out of reach for the vast majority of the population. Pakistan has one of the highest ratio of health workers to total population in the world (1:90 per million). The relatively small sample is the limitation of the study. Design studies with a larger sample size and more study variable in in future are recommended.

CONCLUSION

Musculoskeletal cancers were found to have significant associations with gender and age groups in this study. It is also concluded that soft-tissue sarcoma, chondrosarcoma, and osteosarcoma are the most common musculoskeletal cancers amongst Pakistani population.

Ethical permission: Director ORIC/MRC, Liaquat University of Medical & Health Sciences Jamshoro Titled "Letter of Waived off for Ethical approval for the publication of the pilot study" letter No. LUMHS/MRC/643, dated: 18-03-2021.

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AUTHOR CONTRIBUTION

Memon SM: Manuscript Writing, Analysis and Results Interpretation
Mangi FH: Study Concept and Data Collection
Memon FA: Data entry and Statistical Analysis
Sushel C: Data Collection and Discussion
Shaikh AG: Data Collection, Organizing and Summarization
Shaikh TA: Study Design and Data Collection

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