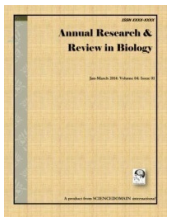

Annual Research & Review in Biology
5(6): 553-562, 2015, Article no.ARRB.2015.058
ISSN: 2347-565X

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Histopathologic Patterns of Adipocytic Tumours in University of Benin Teaching Hospital; a Twenty Year Retrospective Study

E. I. Odokuma[1*], V. J. Ekanem[2] and O.E. Osemeke[1]

[1]Department of Human Anatomy and Cell Biology, Delta State University, Abraka, Nigeria.
[2]Department of Morbid Anatomy, University of Benin, Benin City, Nigeria.

Authors' contributions

This work was carried out in collaboration between all authors. Author EIO designed the study, wrote the protocol and interpreted the data. Author VJE anchored the field study, gathered the initial data and performed preliminary data analysis. Author OEO managed the literature searches and produced the initial draft. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/ARRB/2015/13431
Editor(s):
(1) George Perry, Dean and Professor of Biology, University of Texas at San Antonio, USA.
Reviewers:
(1) Anonymous, Assiut University, Egypt.
(2) Anonymous, Chang Gung University, Taipei, Taiwan.
(3) Jerzy Bełtowski, Department of Pathophysiology, Medical University, Lublin, Poland.
(4) Anonymous, Kyushu University, Japan.
(5) Stephana Carelli, University of Milan, Italy.
Complete Peer review History: http://www.sciencedomain.org/review-history.php?iid=795&id=32&aid=7043

Original Research Article

Received 16th August 2014
Accepted 21st October 2014
Published 21st November 2014

ABSTRACT

Introduction: Adipocytic (lipomatous) tumours have been described as soft tissue neoplasms composed of adipocytes at different stages of maturity. The predominant benign varieties are usually managed by surgical excision and therefore have much better prognosis than the malignant forms which have been associated with high fatality ratio. A detailed study of these lesions is therefore of enormous significance especially with the malignant varieties.
Materials and Methods: The records of consultations during the 20-year period in the Department of Morbid Anatomy, University of Benin Teaching Hospital were utilized for the study. Relevant clinical information was obtained from the available surgical pathology records. Approval for this study was obtained from University of Benin Teaching Hospital ethics committee; (Protocol number ADM/E22/VOLVII/742).
Results: A total of three hundred and twenty-five lesions (325) were recorded. Female cases (169;

**Corresponding author: E-mail: secretfiles1800@yahoo.com;*

52%) were observed to be more than in their male counterparts (156; 48%) but their frequencies were strongly correlated ($p<0.001$; $r = 0.95$). Benign tumours constituted the bulk of the tumours (312; 96%) while only 4% (13) were malignant. Most malignant adipocytic tumours were observed to occur in males 68% (8) and these were distributed within the second to ninth decade unlike in females where the lesions peaked in the fifth decade of life. Lipomas were the most common type of benign adipocytic tumours 99% (308). In this study, thirteen cases of liposarcomas were recorded.
Conclusion: This study demonstrated that lipoma's were the most common adipocytic soft tissue tumours. Generally, adipocytic tumours were commoner in females in the fourth decade of life, especially on the skin of the back and head amongst others and were majorly benign.

Keywords: Histopathologic; adipocytic; lipoma; gender; age; distribution; type.

1. INTRODUCTION

Adipocytic (lipomatous) tumours have been described as a soft tissue neoplasms composed of adipocytes at different stages of maturity [1]. This group of tumours have been classified based on their morphologic features and genetic composition into forms ranging from benign to malignant varieties [2].

Though the aetiological basis for development of these tumours is unknown, several reasons have been adduced for formation of this group of lesions. Some of these include exposure to hazardous environmental chemical pollutants, irradiation, infections and severe immune deficiency [3,4].

Adipocytic tumours have been described to constitute about a third of soft tissue tumours accounting for the most common of soft tissue tumours [5,6]. Similarly, the benign variety, especially lipoma have been described as the most common of the adipocytic tumours [5,6]. These benign lesions are usually managed by surgical excision and therefore have much better prognosis than the malignant forms which are associated with high fatality ratio [7].

A detailed study of these lesions is therefore of immense value especially for the malignant varieties and even the benign group owing to the remote possibility of malignant transformation. Moreover, few studies on adipocytic tumours in the area of study have been conducted [8].

2. MATERIALS AND METHODS

2.1 Materials

The records of consultations in the 20-year period commencing January 1, 1990 and ending December 31, 2010 in the Department of Morbid Anatomy, University of Benin Teaching Hospital were analysed.

Relevant clinical information including age, sex, location and behaviour of lesions were obtained from the available surgical pathology records.

2.2 Inclusion Criteria

Only adipocytic tumours originating from somatopleuric mesoderm, intra-abdominal and retroperitoneal lesions arising in the chest, abdominal walls and paraspinal region were included in this study [9].

2.3 Exclusion Criteria

Cases where adequate biodata could not be obtained or where original tissue blocks were not found were excluded from this study.

2.4 Method

Formalin fixed, paraffin embedded tissue specimen sectioned at 3µm and stained with haematoxylin-eosin were utilized in this study [10]. The lesions were individually reviewed and standardized in accordance with the classification system recommended by the World Health Organization [9]. For purposes of analysis, all lesions were placed in any of the 10 anatomical categories: hand and wrist, upper extremity, proximal limb girdle (axilla and shoulder), foot and ankle, lower extremity, hip and buttocks region, head and neck, trunk, retroperitoneum, and other lesions. Age was recorded at intervals of ten (10) years and the patient's gender was recorded for each case.

2.5 Analysis of Results

The sites, percentage frequencies of the observed types, age intervals, gender correlation coefficients and the p values were determined with the Statistical Package for the Social Sciences (SPSS) version 16. The results were

presented in tables, charts and histological slides.

2.6 Ethical Clearance

Approval for this study was obtained from University of Benin Teaching Hospital ethics committee as recommended by the provisions of the Declaration of Helsinki in 1995 (Protocol number; ADM/E22/VOLVII/742) [11].

3. RESULTS

In Tables 1a and 1b, the age interval of the different observed adipocytic tumours with respect to gender are shown (charts 1 and 2). A total of three hundred and twenty-five lesions (325) were recorded over the twenty year period. This constituted 1.12% of the entire diagnosis made during the period of study. Though female cases (169; 52%) were observed to be more than in their male counterparts (156; 48%), the difference was not significant ($p > 0.05$). It was also observed that the frequency of the tumour types in studied males showed a strong positive correlation with their female counterparts ($p<0.001$; $r = 0.95$). Benign tumours constituted the bulk of the tumours (312; 96%) while only 4% (13) were malignant. Most malignant adipocytic tumours were observed to occur in males 68% (8) and were distributed within the second to ninth decade unlike in the females where the lesions peaked in the fifth decade of life.

Lipomas were the most common type of benign adipocytic tumours 99% (308). This tumour occurred predominantly in females 53% (162) unlike their male counterparts 47% (146) and the lesion involved all age groups with the peak age of occurrence in the fourth decade in both male and female as shown in Tables 1a and 1b. These tumours were composed of matured adipocytes separated by thin fibroconnective tissue stroma in which were blood-vessels. Individual cells were of variable sizes with moderate to large vacuolated cytoplasm and peripherally disposed nuclei (Fig. 1).The lesion was seen in several sites of the body especially the back, scalp, face, shoulder, thigh and gluteal region amongst others (Chart 3, Table 2).

A single case of lipoblastoma was observed to occur in this study accounting for 0.7% of benign adipocytic tumours in males and 0.3% of the total adipocytic tumours. This lesion occurred within the first decade of life and was located in the gluteal region (Table 2). Sections of the lesion showed a mixture of mature and immature cells (lipoblast and adipocytes) disposed in large clusters which were separated by thin fibroconnective tissue stroma in which were some thin walled blood vessels. The cyto-architecture revealed moderately extensively vacuolated cells with peripherally disposed nuclei. The nuclei were of varying shapes but had prominent nucleoli and coarse chromatin (Fig. 2).

Similarly, one case of myolipoma was recorded in this study (Table 2). This singular case, which was recorded in a male accounted for 0.7% in males and 0.3% of benign adipocytic tumours in both sexes respectively. The tumour was located in the anterior abdominal wall and was only distributed within the first decade of life. The lesion was composed of mature adipocytes disposed in clusters and separated by thin bundles of mature smooth muscle cells and fibroconnective tissue. The adipocytes had flattened and peripherally disposed tissue nuclei with abundant vacuolated cytoplasm and outlined cell bundles. Blood vessels were also present within the fibromuscular connective tissue stroma.

A single case of hibernoma was also recorded in this study but unlike the previous two lesions, it was observed in a female in the first decade of life. It constituted 0.6% of benign adipocytic tumours in females and it accounted for 0.3% of adipocytic neoplasms observed. This lesion was located in the arm (Table 2) and was composed of lipoblasts with variably shaped bland nuclei, amphophilic to basophilic cytoplasm with extensive vacoulation creating nuclei indentation in some cells.

In this study, thirteen cases of liposarcoma were recorded. Males accounted for 62% of the entire malignant adipocytic tumours. Though the age distribution ranged from the second to the ninth decade, most tumours occurred in individuals fifty years and above. The commonest location was in the lower extremities especially the thigh (Table 2). The lesion was composed of spindle cells disposed in irregular patterns invading the underlying scant connective tissue stroma and few blood vessels. The cell nuclei were pleomorphic and hyperchromatic with abnormal mitosis. Foci of vacuolated and hypo cellular areas were seen (Fig. 3).

Table 1a. Frequency distribution of adipocytic tumours according to type, age in males

	Age interval	Lipoma	Lipoblastoma	Myolipoma	Hibernoma	Liposarcoma	Total
1	1-10	7	1	1			9
2	11-20	6				2	8
3	21-30	27					27
4	31-40	40					40
5	41-50	28				1	29
6	51-60	18				2	20
7	61-70	9				2	11
8	71-80	5				1	6
9	81-90	6					6
		146	1	1		8	156

Table 1b. Frequency distribution of adipocytic tumours according to type, age in females

	Age interval	Lipoma	Lipoblastoma	Myolipoma	Hibernoma	Liposarcoma	Total
1	1-10	3			1		4
2	11-20	9					9
3	21-30	41					41
4	31-40	41			1	1	43
5	41-50	37				4	41
6	51-60	19					19
7	61-70	10					10
8	71-80	2					2
9	81-90						
		162			2	5	169

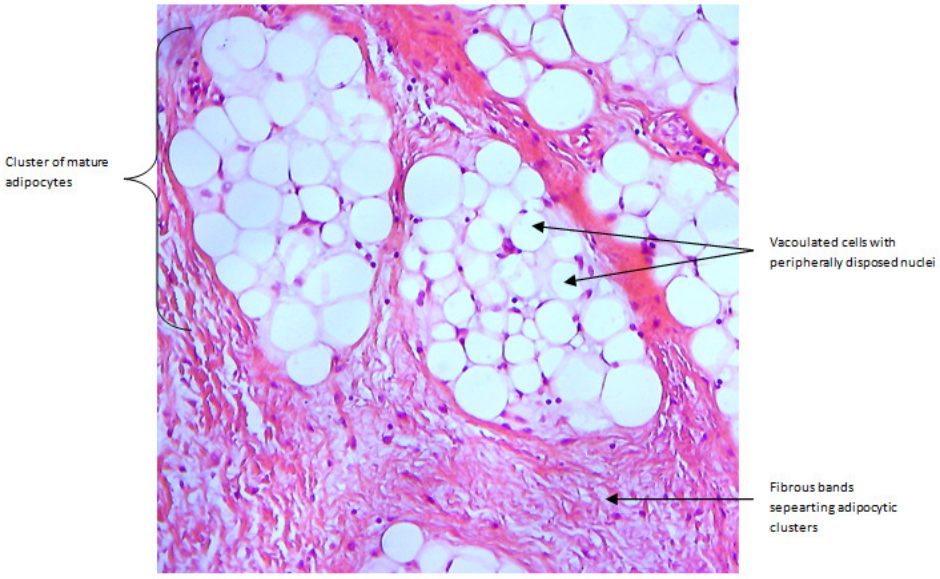

Fig. 1. Section shows a benign lesion composed of Adipocytes of clusters of matured Adipocytes disposed in lobules by fibroconnective tissue stroma. The cells have peripherally disposed nuclei.
H and E x 400

Table 2. Site distribution of adipocytic tumours

S/N	Diagnosis	Head			Trunk			Upper extremity						Lower extremity				Others	Total
		Scalp	Face	Neck	Chest	Abdomen	Back	Forearm	Arm	Finger	Shoulder	Hand	Axilla	Gluteal	Leg	Thigh	Foot		
1	**Adipocytic tumours**																		
2	Lipoma	36	32	16	14	18	43	17	10	2	30	1	6	19	9	20	5	30	308
3	Lipoblastoma													1					1
4	Fibromyolipoma					1													1
5	Hibernoma								1									1	2
6	Liposarcoma					1										5		7	13
	Total	36	32	16	14	20	43	17	11	2	30	1	6	20	9	25	5	38	325

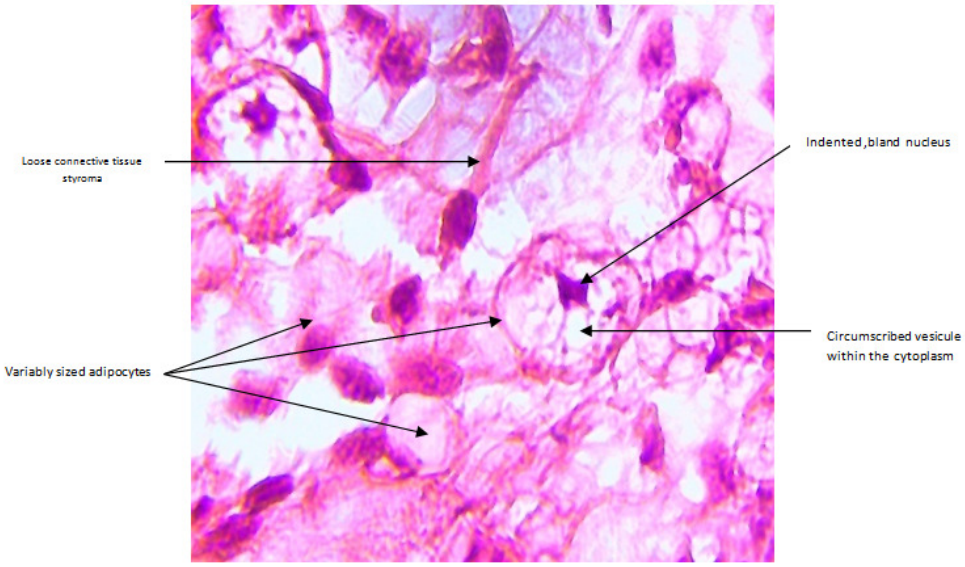

Fig. 2. Lipoblastoma Section shows mature and immature Adipocytes of variable sizes separated by a thin connective tissue stroma. The cytoplasm is disposed in vesicles with centrally placed prominent indented and bland nuclei.
H and E x 400

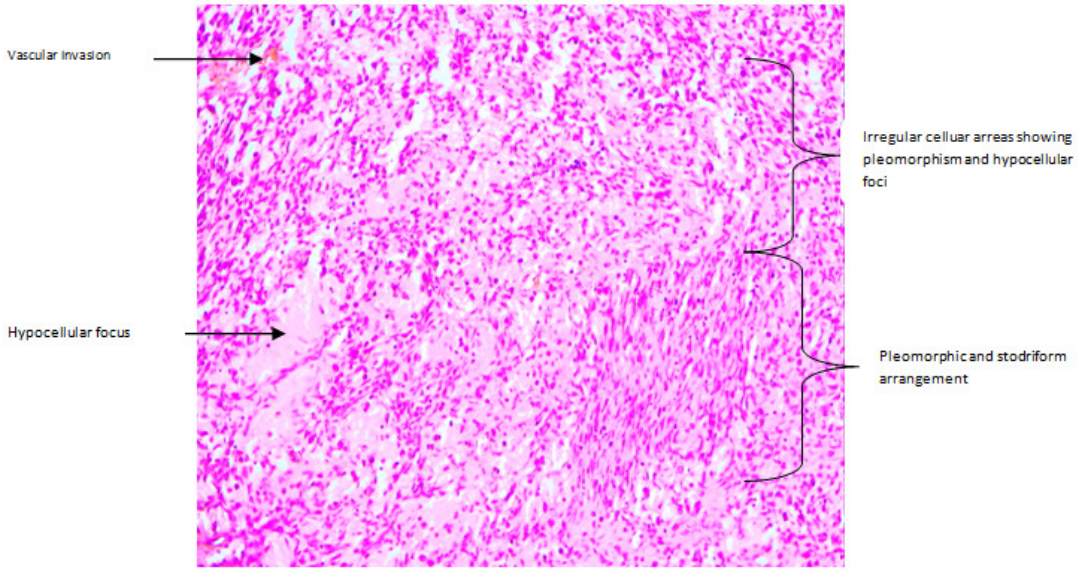

Fig. 3. Liposarcoma; The lesion was composed of spindle cells disposed in irregular patterns invading the underlying scant connective tissue stroma and few blood vessels. The cell nuclei are pleomorphic and hyperchromatic with abnormal mitosis. Foci of vacuolated and hypo cellular areas are seen.
H and E x 100

4. DISCUSSION

Adipocytic tumours have been described as the most common of the soft tissue tumours [12]. This study demonstrated that benign adipocytic tumours were the most common variety of adipocytic tumours [13,14]. Similarly, as has been shown elsewhere, lipomas clearly outnumbered all the other varieties of benign of adipocytic tumours [13,14]. The reason for this observation could be explained by the relative abundance of adipose tissue which forms the loose connective tissue of the hypodermis which supports the skin and several visceral structures [15]. These lipomas were observed to occur predominantly in sites similar to prior observations [14,16]. The explanation for the distribution can be explained by the common sites exposed to injury or intense tissue pressure [17]. It is possible that injury could result in neoplastic change [17].

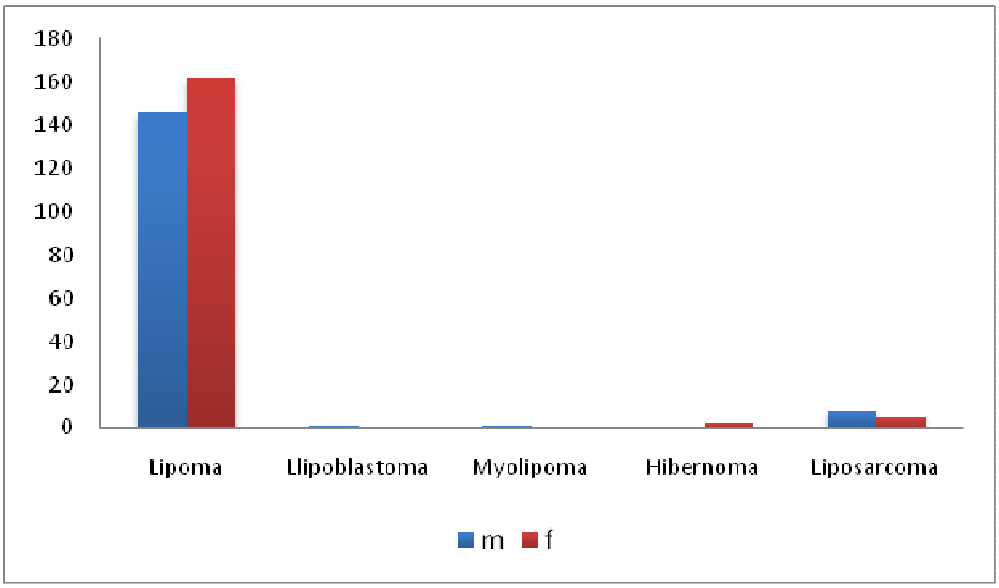

Chart 1. Gender distribution of Lipomatous lesions

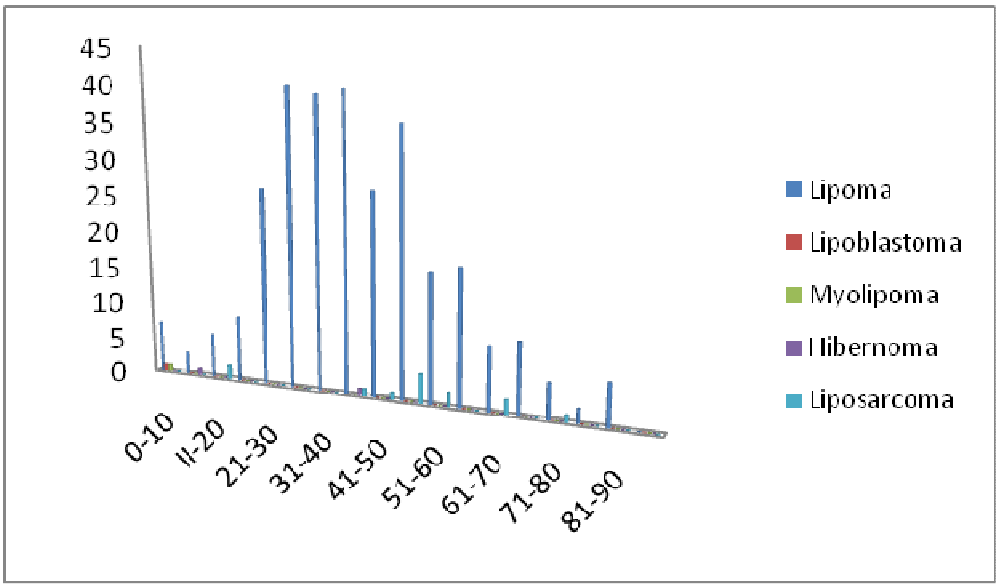

Chart 2. Age interval distribution of Lipomatous tumours

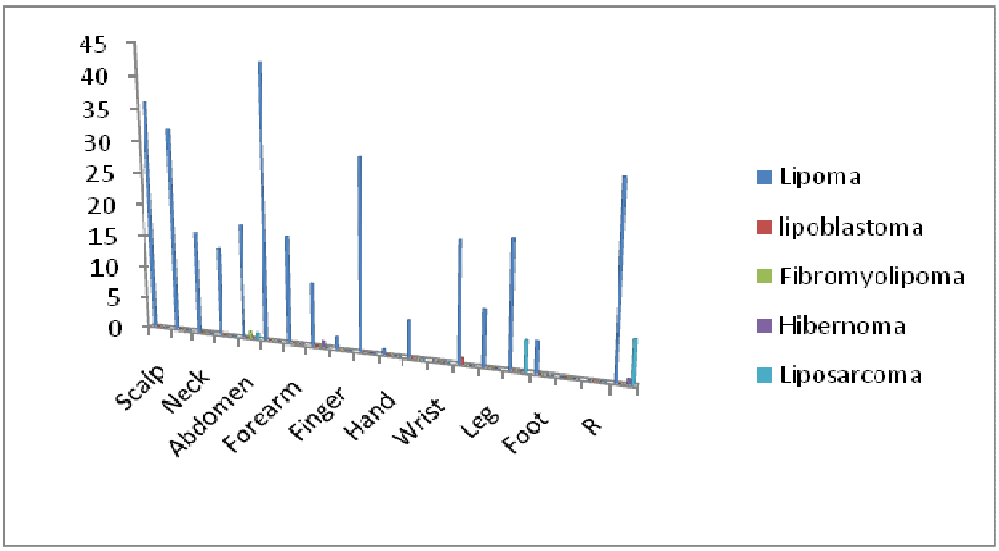

Chart 3. Site distribution of the various Lipomatous tumours

A previous report highlighted that the occurrence of lipomas favoured males [18]. This study revealed that females were more likely to be affected. The benign adipocytic tumours recorded in this study were observed to occur predominantly in the 4th decade of life but less so than in the third and fifth decades respectively and fewer cases in children and elderly. These result were not different from earlier studies were similar observations were made [19,20]. The peak age of occurrence of these tumours may not be unrelated to several factors including aging and change in diet, sedentary life style, specific tissue atrophy which may result in hormonal imbalance among others. Other benign tumours, hibernoma and myolipoma were observed to occur predominantly in females and within the fourth decade of life as was captured in a previous report [14]. There is a possibility that some of these fat tissues may have transformed from normal adipocytes to hibernomas on exposure to injury as was explained elsewhere [17]. Brown fat has been demonstrated to occur predominantly in foetal life but is subsequently transformed to normal (white) adipose tissue with maturity [21,22].

Amongst the malignant group of tumours, liposarcomas have been described as one of the most common mesenchymal soft tissue malignant neoplasms [23-32]. The observed variety in the index study was the mixed low grade myxoid/round cell variety and a few pleomorphic forms. The mixed low grade myxoid group has been shown to be the most common while the pleomorphic variety is known to be a distinct variety [28]. The observed types have earlier been demonstrated to occur in certain age groups as was observed in this study in which majority of the lesions occurred in the fifth decade. Similarly, as was observed in the results of the Cleaveland study, male predominated over their female counterparts as was also reported in several studies [33-34]. The reason for this gender predilection is still unclear [35]. Several studies have shown that the lower extremities were the predominant site of occurrence of these lesions [36-38] as was also revealed in the index study.

5. CONCLUSION

This study has shown that lipoma's were the most common adipocytic soft tissue tumours. Generally, adipocytic tumours were commoner in females ($p>0.05$) and they were found predominantly in the fourth decade of life especially in the skin of the back and head amongst others and were majorly benign.

COMPETING INTERESTS

Authors have declared that there were no competing interests in this study.

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http://www.sciencedomain.org/review-history.php?iid=795&id=32&aid=7043