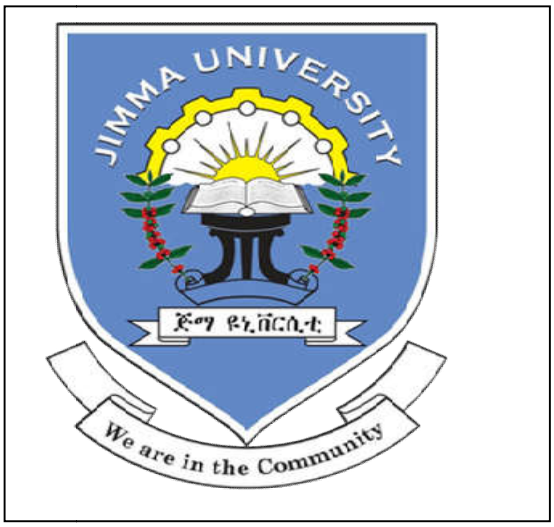
JIMMA UNIVERSITY MEDICAL CENTER DEPARTMENT OF PATHOLOGY



Histopathologic Patterns of Oral and Maxillofacial Masses in Southwestern Ethiopia: A 5 Years Retrospective Study

By Tewodros Deneke (MD)

A Research Paper To Be Submitted To Department Of Pathology, Jimma University For Partial Fulfillment Of Post Graduate Diploma In Human Anatomic Pathology

JIMMA UNIVERSITY MEDICAL CENTER DEPARTMENT OF PATHOLOGY

Histopathologic Patterns of Oral and Maxillofacial Masses in Southwestern Ethiopia: A 5 Year Retrospective Study

A Research Paper To Be Submitted To Department Of Pathology, Jimma University For Partial Fulfillment Of Post Graduate Diploma In Human Anatomic Pathology

Investigator: Tewodros Deneke (MD)

Advisors: Dr. Gebi Namo (Assistant Professor of pathology)

Dawit Regassa (Bsc, MPH)

Jun 2019

Abstract

Back ground:- Oral and maxillofacial region includes nasal cavity, sinuses, the lips, oral cavity, maxilla, mandible and the major and minor salivary glands with the overlying skin and soft tissues. This area is common site for different lesions, including the inflammatory and neoplastic lesions. Neoplastic tumors, in the area, account 5% of all human Neoplasia. The distribution of these tumors changes with the socio-demographic change throughout the world and is not well studied on the study area.

The objective:- of this study was to assess the histopathologic patterns of oral and maxillofacial masses among patients attending histopathology unit of pathology department in Jimma medical center from September 11, 2013 to September 10, 2018.

Methods:- A Retrospective cross sectional study was conducted. 377 OMF mass samples fulfilling the inclusion criteria were included in the study. Data was collected by structured check list and the data was interred into Epi-data version 3.1 and transferred to SPSS version 22 for analysis. The study was conducted from May 1, 2019 to August 30, 2019 GC.

Result:- the age distribution of OMF masses are with Minimum age value of 1 year and maximum value of 85 years and median age is 30years.From 377 patient 194 (51.5%) were male while 183(48.5) were female with a ratio of M:F=1.06:1 showing increased male dominance. Mesenchymal tumours, other than bone tumor, have the highest number of 128 (33.9%) cases followed by surface epithelial tumors, 75(19.9%), Odontogenic tumors 20(5.3%), salivary gland tumors 55(14.6%), benign cystic mass 47(12.5%), inflammatory masses 42(10.9%) and the least numbers of OMF biopsy was bone tumor with 11(2.9%) cases. From the benign tumors fibroepithelial tumor 53(22.8%) is the commonest. From the malignant tumors and from carcinoma, squamous cell carcinoma 56(57.1%), is the leading. From sarcomas Osteosarcoma 8(8.2%) is the commonest one.

Conclusion:-The result of this research shows the distribution of oral and maxillofacial tumors varies with the age, sex and anatomic site of the patients. OMF mass is common on the early adult age period and the risk of malignant tumors increases in those with age ≥ 41years and the commonest malignant tumor is squamous cell carcinoma but in children and adolescents benign tumors specially fibroepithelial polyps are the commonest with male predominance.

Key words: - Oral and maxillofacial mass, Histopathology and Ethiopia

Table of Contents

Abstract 3
Back ground:- 3
The objective:- 3
Methods:- 3
Result:- 3
Conclusion:- 3
Key words: - 3
List of Figures 6
List of Tables 6
List of Acronyms 7
Acknowledgement 8
1. Introduction 9
1.1. Background 9
1.2. Statement of Problem 11
1.3. Significance of the study 12
2. Literature review 13
2.1. OMF masses with respect to sex 13
2.2. OMF masses with respect to age of patient 14
2.3. OMF masses with respect to histologic pattern of distribution 14
2.4. OMF masses distribution with respect to anatomic sites in the oral and maxillofacial regions 16
2.5. Conceptual frame work 17
3. Objectives of the research 18
3.1. General objectives 18
3.2. Specific objectives 18
4. METHODES AND MATERIALS 19
4.1. Study area and study period 19
4.2. Study design 20
4.3. Populations 20
4.3.1. Target population 20

4.3.2. Source population 20
4.3.3. Study population 20
4.4. Sample size and sampling technique 20
4.5. Data collection instrument 20
4.6. Study variable 21
4.6.1. Independent variables 21
4.6.2. Dependent variables 21
4.7. Eligibility criteria 21
4.7.1. Inclusion criteria 21
4.7.2. Exclusion criteria 21
4.8. Operational definition 21
4.9. Data processing and analysis 22
4.10. Data quality control 22
4.11. Ethical consideration 22
4.12. Dissemination of the results 22
5. Results 23
5.1. Distribution of OMF masses in year 23
5.2. OMF mass histopathology with respect to age 23
5.3. OMF mass histopathology with respect to sex 25
5.4. Distribution of OMF masses with respect to anatomic site 25
5.5. Distribution of OMF mass with histopathologic type 27
6. DISCUSSION 31
7. Conclusion 34
8. Recommendation 34
9. References 35
10. Appendices/Annexes 38
Annex-1:- List of Dummy tables 38
Annex-2: Approval 40

List of Figures

Figure 1 conceptual frame work in JUMC from 2013 to 2018 [12],[14],[18]..... 17
Figure 2 MAP OF THE STUDY AREA 19
Figure 3 Frequency of OMF mass in each year in JUMC from 2013 to 2018 23
Figure 4 OMF mass category distributions with age group of the patients in JUMC from 2013 to 2018..... 24
Figure 5 frequency of MOF mass in each year in JUMC from 2013 to 2018 27
Figure 6 Frequency of OMF mass category distribution in JUMC from 2013 to 2018 30

List of Tables

Table 1 Age distribution of OMF mass in JUMC from 2013 to 2018..... 24
Table 2 OMF mass distribution with sex of the patients in JUMC from 2013 to 2018..... 25
Table 3 OMF mass distribution with the anatomic site in JUMC from 2013 to 2018 26
Table 4 OMF mass histopathologic category with respect to the anatomic site in JUMC from 2013 to 2018 29
Table 5 OMF mass diagnostic category in JUMC from 2013 to 2018..... 38
Table 6 Year of biopsy done with age and sex in JUMC from 2013 to 2018 38
Table 7 Age category of OMF mass in JUMC from 2013 to 2018 39
Table 8 category based on histopathologic type in JUMC from 2013 to 2018 39
Table 9 Anatomic site of OMF mass in JUMC from 2013 to 2018 39

List of Acronyms

FNAC ---------- Fine needle aspiration cytology

H&E----------Hematoxylin and Eosin

IRB----------Institutional review board

JUMC----------Jimma University Medical Center

OMF----------Oral and maxillofacial

OSCC----------Oral squamous cell carcinoma

SPSS----------statistical package for social science

Acknowledgement

First of all I want to thank Jimma University for giving me this chance to do a research by focusing on the real problem of the community.

I extend my gratitude to pathology department in identifying thematic area which need investigation and allowed me to prepare action proposal and proceed to the research.

I also thank my advisors Dr. Gebi Namo (Assistant Professor of pathology) and Dawit Regassa (Bsc, MPH) for giving me constructive comments and important information to prepare my proposal and research thesis.

1. Introduction

1.1. Background

Oral and maxillofacial region includes nasal cavity, sinuses, the lips, oral cavity, maxilla, mandible and the major and minor salivary glands with the overlying skin and soft tissues. This area is common site for different lesions, including the inflammatory and neoplastic lesions. Neoplastic tumors, in the area, account 5% of all human Neoplasia. Due to the anatomic complexity of the area, inflammatory masses and tumors affecting oral and perioral tissues often present a diagnostic challenge to the pathologist and the surgeon [1].

There are many benign masses on this site including cysts, polyps and inflammatory lesions. The malignant masses usually found in this region include sarcomas of soft tissue and bone, carcinomas and lymphomas rarely melanomas. Some of these cancers however are metastases from distant sites such as the breast, lungs, abdominal organs or even the prostate gland. The age at diagnosis of these masses is between 9 months to 80 years with 90% of the patients being over the age of 40 years [2]. Different masses can be noticed based on the anatomic site.

Carcinomas of the nasal cavity and paranasal sinuses account for 0.2-0.8% of all malignant neoplasm and 3% of those occurring in the head and neck. Tumors on this site include benign and malignant epithelial, soft tissue, bone, haematolymphoid, neuroectoderma and germ cell tumors including secondary metastasis to the site [2].

Tumors of the oral cavity and oropharynx are either epithelial, mesenchymal, or haematolymphoid. The epithelial tumors may be classified as those originating within the epithelium lining of the oral cavity and oropharynx and those derived from salivary gland tissue. More than 90% of malignant neoplasms of the oral cavity and oropharynx are squamous cell carcinomas of the lining mucosa with relatively rare neoplasms arising in minor salivary glands and soft tissues. Males are affected more often than females because of heavier indulgence in both tobacco and alcohol habits in most countries [2].

Odontogenic tumours and tumour-like lesions constitute a group of heterogeneous diseases that range from hamartomatous or non-neoplastic tissue proliferations to benign neoplasms and malignant tumours with metastatic potential. They are derived from epithelial, ectomesenchymal and/or mesenchymal elements of the tooth-forming apparatus. These tumours, therefore, are found exclusively within the maxillofacial skeleton (intraosseous or centrally located), or in the soft tissue (gingiva) overlying tooth-bearing areas or alveolar mucosa in edentulous regions (extraosseous or peripherally located). The tumours may be generated at any stage in the life of an individual. Knowledge of basic clinical features such as age, gender, and location are extremely valuable in developing differential diagnoses of odontogenic tumours [1].

Salivary gland comprises the three paired major glands, the parotid, submandibular and sublingual, and the minor glands. The latter are numerous and are widely distributed throughout the mouth and oropharynx and similar glands are present in the upper respiratory and sinonasal tracts, and the paranasal sinuses can show tumours with striking range of morphological diversity between different tumour types and sometimes within an individual tumour mass[1].

In addition, hybrid tumors, dedifferentiation and the propensity for some benign tumours to progress to malignancy can confound histopathological interpretation. Unfortunately, the morphological variability of these tumors is mirrored by the immunocytochemical profiles, so that special stains are rarely useful in routine diagnosis of salivary gland epithelial neoplasms. As a result, histopathologic technique is the main stay of the routine diagnosis [2].

Although many sophisticated techniques are available to assist in tissue diagnosis, histopathologic technique is the golden standard for routine service. Steps on this technique include preparation of a paraffin block from excised tissue which must be "fixed" to prevent autolysis and make the tissue rigid for easier handling. Fixing also kills microorganisms. The fixative most frequently used is 10% buffered formalin, which should be about 20 times the volume of the specimen. After fixation, the specimen is prepared by passing it through a series of graded alcohols (from 70% to absolute) to dehydrate the tissue, followed by immersion in xylene or similar substance to remove the alcohol, followed by immersion in liquid paraffin. After paraffin block preparation, Serial sections of tissue are prepared. The sections are then stained with hematoxylin& eosin (H&E) stain. It is on this basis that most diagnoses are made [6].

1.2. Statement of Problem

Tumors in the oral and maxillofacial region are unique due to the obvious cosmetic defect and functional impairment of the anatomically related aero-digestive tract. Orofacial tumors are known to exhibit geographic variations in prevalence and pattern due to cultural, social, occupational or climatic factors [6].

Researches done on oral and maxillofacial mass throughout the world shows different result which has variation with socio-demographic factors of the specific areas.

A study done on oral and maxillofacial masses in Australian shows the commonest Histopathologic variant is fibrous hyperplasia, followed by chronic periapical granuloma, radicular cyst and dentigerous cyst [7].

But, a similar research done in Nigeria shows squamous cell carcinoma and Ameloblastoma are the most predominant orofacial tumor [11]. In Kenya Ameloblastoma, Burkett's lymphoma, ossifying fibroma and Osteogenic sarcoma are the most common oral and maxillofacial masses in order [20].

Research done in St. Paul's Hospital, Addis Ababa, Ethiopia, benign tumors are more common than the malignant and Ameloblastoma was the leading among benign tumors while squamous cell carcinoma was the most prevalent malignant tumor [14].

These all result shows, the variation of histopathologic patterns of the oral and maxillofacial tumors at different areas of the world with variation on socio-demographic factors. In Ethiopian researches that focus on histopathologic patterns of oral and maxillofacial masses with respect to factors such as anatomic sites, age, sex and histologic type are few and especially on the south western part, no research is available on this topic. Lack of studies on the above associated factors have created huge gap on the understanding of the full picture of the tumor burden and distribution in the study area resulting difficulty on understanding of the distribution, early detection, diagnosis, interventions and management of the problem.

The aim of this study is to determine the histologic types, prevalence and socio-demographic distribution of oral and maxillofacial masses in south western Ethiopia.

1.3. Significance of the study

This study helps to determine the histopathologic patterns of oral and maxillofacial masses with respect to age, sex and site of the tumor. As there is no research done on the topic in the area, it helps to show the distribution of oral and maxillofacial masses within the study area and helps the Hospital Administrators in the planning and management of resources for strengthening of the pathology as well as the oral and maxillofacial unite by understanding the burden of the problem. It is also a good base of reference for further research on the area for interested individuals.

2. Literature review

Oral and Maxillofacial (OMF) area is among the commonest areas of different lesions. For that matter a specialty of oral and maxillofacial pathology and surgery is well established in most part of the world and different researches are conducted to assist the diagnosis and management of these tumors. The results of these researches show different Histopathologic distribution of these masses with respect to age, sex, anatomic site and Histopathologic type of the lesions.

2.1. OMF masses with respect to sex

Different studies done in different countries on oral and maxillofacial mass shows different distribution with respect to sex. Retrospective analysis of 714 biopsied oral and maxillofacial lesions in South-Western Saudi Arabia shows a slight female (56.9%) predominance with a male-to-female ratio of 1:1.3 [15]. Similar research done in Brazil shows female dominance, 53.24 were female while 46.1 were male with a male to female ratio of 1: 1.2[24]. Similar result is also seen on research done in pediatric population of Brazil with slight female predominance with male to female ratio of 1:1.7[9]. A research done in Australia on oral and maxillofacial pathology shows female preponderance with 39.2% male and 53.3% female and male to female ratio of 1:1.4 [7]. Similar research, done in Tanzania, shows females 56.7% and males 42.3% with male to female ratio of 1:1.3 [4]. A retrospective study of 77 patients done in Nigeria also shows a male/female ratio of 1:1.03[8].

But eleven years retrospective research done in Nigeria on 2014 shows male 65.8% and female 34.2%, giving a male to female ratio of 2:1 [12]. This shows the variable distribution of oral and maxillofacial tumor with socio-demography of a country and different study period. Researches done on other areas also show similar variability with respect to sex of patients, giving a male predominance. A retrospective analysis, done in Bangladesh teaching hospital, shows a slight male preponderance of these masses with male to female ratio of 1.29:1 [25]. Similarly, a retrospective study of oral and maxillofacial pathology in Jeddah shows 52.8% male and 42.3% females, with slight male dominance [26]. It is also seen on the research done in Nigeria, Male 65.8% and females 34.2%, giving a male to female ratio of almost 2:1 [12]. Similar research in Ghana shows 58% males and 42% females with a male to female ratio of 1.3:1 [18]. A study done on Orofacial Neoplasm in Patients Visited St. Paul's Hospital, Addis Ababa, Ethiopia, shows similar male dominance, male to female ratio was 1.21:1 [14]. Oral maxillofacial neoplasms in an East African population a 10 year retrospective study of 1863 cases using histopathological reports also shows 53.71% were males compared to 45.32% females and 0.97% were not specified. The overall the male female ratio was 1.2:1, In Tanzania 1.3:1 and in Uganda 1.14:1. Of the male cases 71.74% were malignant compared to 61.88% among females.11.12% of the male neoplasms were odontogenic compared to 21.65% of the female cases [21].

2.2. OMF masses with respect to age of patient

Researches done in different parts of the world, on oral and maxillofacial masses, show a wide range of distribution with respect to the age of patients. But many of them indicate, second and third decades are the commonest age of presentation. A retrospective study of oral and maxillofacial pathology in Jeddah shows minimum age of occurrence is 5 month and maximum was 85 years, mean 35.9yrs and SD 17.9 yrs [26]. Analysis of biopsied oral and maxillofacial masses in South-Western Saudi Arabia shows the mean age was 46.8 with standard deviation of ±23 years, ranging from near birth (<1) to 100 years [15]. A similar research done in Australia shows 14.2 was children and less than 17yrs and 65.5% were from adults and above age 17yrs [7]. A retrospective research done in Bangladesh also shows 21% were below age 20yrs and above the age 20 were 79% and most Patients were between 10 years and 72 years with most patient, 27.27%, are in 51 to 60 years of life [25]. A multicenter study of biopsied oral and maxillofacial masses in a Brazilian pediatric population shows highest frequency of lesions (60.7%) was observed in the 9–12-year age groupand5.2%of these patients were 0 to 12 years old [5]. A research on oral and maxillofacial masses in children and adolescents in the Brazilian population shows 0-9 yrs were 19% and 10-19yrs were 81% [3]. Eight years analysis done in Ghana on similar topic shows the mean age at presentation of all lesions was 40.4 years with over 50% of benign lesions in patients aged between 11 and 30 years. Malignant tumors were more commonly detected in patients between 41 and 70 years (63%) [18]. Nigerian research done on oral and maxillofacial tumors also shows the age of the patient ranges from 2-78 yrs with mean age of 50.1 years and standard deviation of ±17.8 with modal age of presentation was the third decade of life[8]. In the east African population the overall average age was 29.29 ± 19.72 with a range of 0.06–97 years. The neoplasms showed a wide range of age distribution with most neoplasms peaking in the second and third decade except Burkitts lymphoma that peaked below 10 years [21]. Research done in St. Paule millennium hospital, Ethiopia, also shows a wide age range, 2-70years with a peak level in the second and third decades except Burkitts lymphoma, which is more common in the first and second decade [14].

2.3. OMF masses with respect to histologic pattern of distribution

The commonest Histopathologic types of masses on oral and maxillofacial area are different in researches conducted at different parts of the world. Retrospective analysis of biopsied oral and maxillofacial masses in South-Western Saudi Arabia shows neoplastic (49.7%) and non-neoplastic (50.3%) lesions. The most frequent oral and maxillofacial lesions category was malignant neoplasm (38.8%), followed by inflammatory lesions (16.5%), reactive lesions (13.7%), non-inflammatory cysts (9.8%), benign tumors (8.7%), and mucosal pathology (8.1%). Oral squamous cell carcinoma (OSCC) was the most common malignant lesion, contributing to 36.1% [15].

A 6-year retrospective study done on Oral and maxillofacial pathologies in Iraq, on total of 616 oral and maxillofacial specimens, One-third of the oral and maxillofacial specimens were in the mucosal and skin pathology category, followed by benign neoplasms (24.2%) - of which 26.8%

were odontogenic tumors and 42.6% were salivary gland tumors - and malignant neoplasms 16.2%. Neoplastic and non-neoplastic salivary gland disorders accounted for 16.7% of the specimens submitted, whereas odontogenic cysts and tumors comprised 5.5% and 6.5% of all biopsies [22].

Research done on the Distribution of oral and maxillofacial lesions in pediatric patients, 16 years-old and younger, from a Brazilian southeastern population, in the 15-year period It was observed that Mucous extravasation cyst represented by far the most common entity in both the salivary gland diseases (97.8%) group and in the whole specimens retrieved (36.3%) [9].

Retrospective study of oral and maxillofacial lesions in older Taiwanese patient's show Most of the lesions were in the inflammatory/infective group, followed by tumour/tumour-like reactive lesions. Squamous cell carcinoma was the most common lesion [16].

Six year review of malignant oral and maxillofacial neoplasms at Dares Salaam, Tanzania shows malignant orofacial lesions accounted for 37.8% of all lesions that were biopsied from oral and maxillofacial region. Squamous cell carcinoma was the most common malignant lesion (62.2%) followed by Kaposi's sarcoma (13.1%) and adenoid cystic carcinoma (7.4%) [17].

Analysis done on Oral and maxillofacial malignancies in Nigeria at academic medical hospital shows 37.8% diagnosed as malignancies, Squamous cell carcinoma (SCC) was the most common malignancy 35.1% , Osteogenic sarcoma 11.7% was the most commonly diagnosed sarcoma. Salivary gland malignancies constituted 31.7%, with mucoepidermoid carcinoma (MEC) occurring most frequently.[8] A similar research done in Ghana shows 45.6% of the patients presented with lesions that were classified as malignant of which 62% were diagnosed as squamous cell carcinoma. 36.3% had benign odontogenic tumours and 18.1% had non-odontogenic tumour-like lesions. 62% of malignant tumours were squamous cell carcinoma; 93.6% of the benign odontogenic tumours were classified as Ameloblastoma [18].

Retrospective analysis on oral and maxillofacial tumors and tumor-like lesions in Nigerian population shows Benign tumors accounted for 86.3% and malignant tumors 13.7%. Ameloblastoma was the most prevalent benign tumor observed 36.3% while squamous cell carcinoma was the most common malignant tumor [12].

A 10 year retrospective study of oral and maxillofacial neoplasms in an East African population shows overall 67.28% of the diagnoses recorded were malignant with Kaposi's sarcoma (21.98%), Burkitts lymphoma (20.45%), and squamous cell carcinoma (15.22%) dominating that group while Ameloblastoma (9.23%), fibroma (7.3%) and pleomorphic adenoma (4.95%) dominated the benign group [21].

A study done on Orofacial Neoplasm in Patients Visited St. Paul's Hospital, Addis Ababa, Ethiopia, a retrospective study, shows the most frequent oral and maxillofacial lesions are

Ameloblastoma (16.02%), pleomorphic adenoma (11.88%), and squamous cell carcinoma (11.60%)[14].

2.4. OMF masses distribution with respect to anatomic sites in the oral and maxillofacial regions

The anatomic locations and distribution of oral and maxillofacial masses are different on different researches. In a retrospective analysis of oral and maxillofacial lesions, tongue (26.5%) was the most frequently involved site, followed by the buccal mucosa (19.6%) in South-Western Saudi Arabia [15].

Mucosal and skin pathology are the commonest one , followed by benign neoplasms of the jaws 26.8% and salivary gland 42.6% were the result of a Research done on Oral and maxillofacial pathologies in Iraq [22].

Salivary gland diseases was the most frequent subgroup of lesions, followed by mucosal pathology and Odontogenic cysts of the jaw, in A Research done on pediatric patients of Brazilian [9].

In Nigeria, 68.8% of the lesions affected both soft and hard tissues, whereas 31.2% affected the soft tissues only, with the buccal mucosa most frequently involved. All primary intrabony tumors were located in the molar/ ramus area of the mandible and the maxillary antrum [8].

A research done in east Africa shows 55.72% of neoplasms whose site was recorded as the mandible were Ameloblastoma while 56.4% of the palatal cases were Kaposi's sarcoma [21].

Similar research done in Patients Visited St Paul’s Hospital, Addis Ababa, Ethiopia, The most commonly involved site was mandible (26.79%) followed by maxilla (14.36%) and buccal mucosa (13.26). the least site involved was submandibular gland area (1.38%). Ameloblastoma and fibroma are exclusively affected the mandible but Burkitts lymphoma is found in the maxilla. 59.8% of tumors located in mandible are Ameloblastoma while 46.3% of maxillary tumors are fibrous dysplasia [14].

2.5. Conceptual frame work

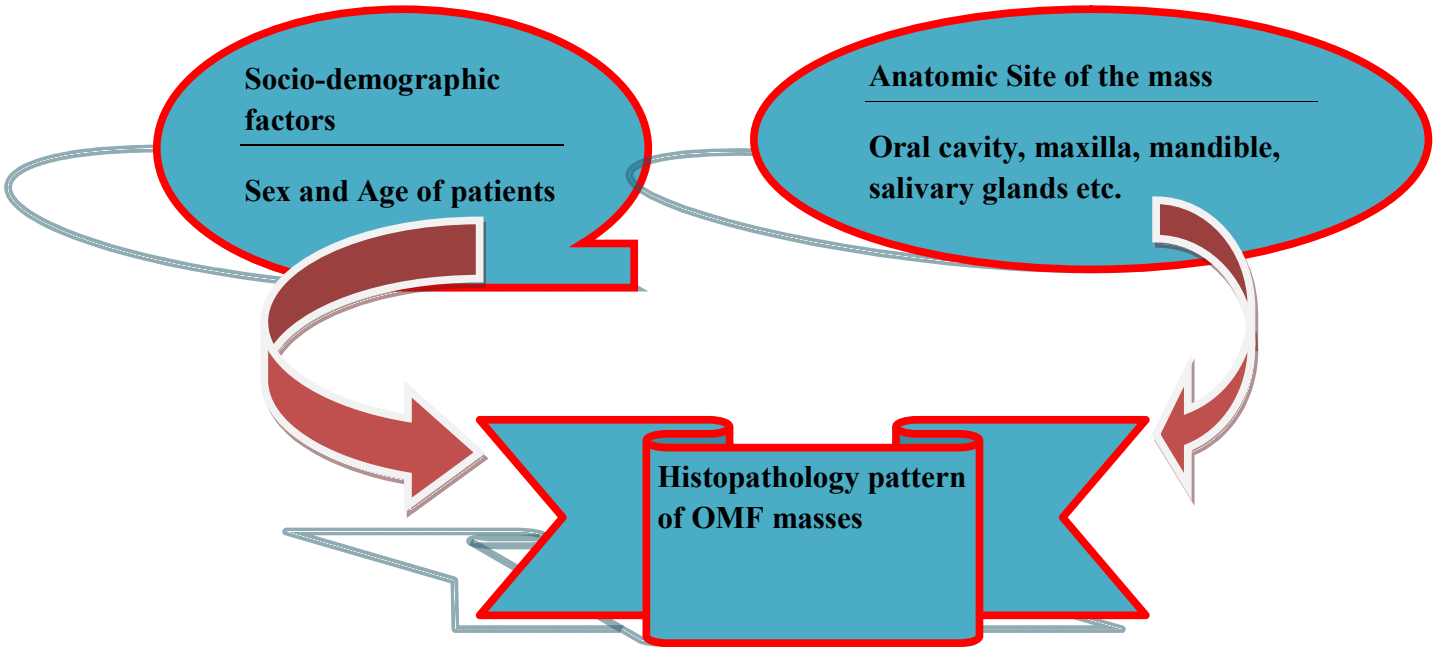


Figure 1 conceptual frame work in JUMC from 2013 to 2018 [12],[14],[18]

3. Objectives of the research

3.1. General objectives

To assess the histopathologic patterns of oral and maxillofacial masses in southwestern Ethiopia from September 11, 2013 to September 10, 2018

3.2. Specific objectives

- To determine the histopathologic patterns of oral and maxillofacial masses.
- To assess the histopathologic patterns of oral and maxillofacial masses with respect to sex.
- To describe the histopathology pattern of oral and maxillofacial masses with respect to age
- To determine the histopathology pattern of oral and maxillofacial masses with respect to anatomic site of the patient

4. METHODES AND MATERIALS

4.1. Study area and study period

The study was conducted in Jimma University Medical Center (JUMC), Pathology Department, which is found in Jimma town, Oromia regional state, Ethiopia. The town is located in South western part of Ethiopia 356KM away from Addis Ababa. The pathology department of JUMC is one of the high burden areas with four pathology seniors, 15 residents, and one histopathology technician and 7 assistant technicians. The services given by the department include: histopathology (biopsy), FNAC and fluid cytology, Hematopathology and Regular teaching activity for pre-clinical medicine and paramedical students. JUMC is the only hospital giving histopathology and cytology services in the southwest region part of the country with Average annual patient flow of more than 1600 and 5,000 for histopathology and cytopathology respectively. The study was conducted from May 1, 2019 to August 30, 2019 GC.

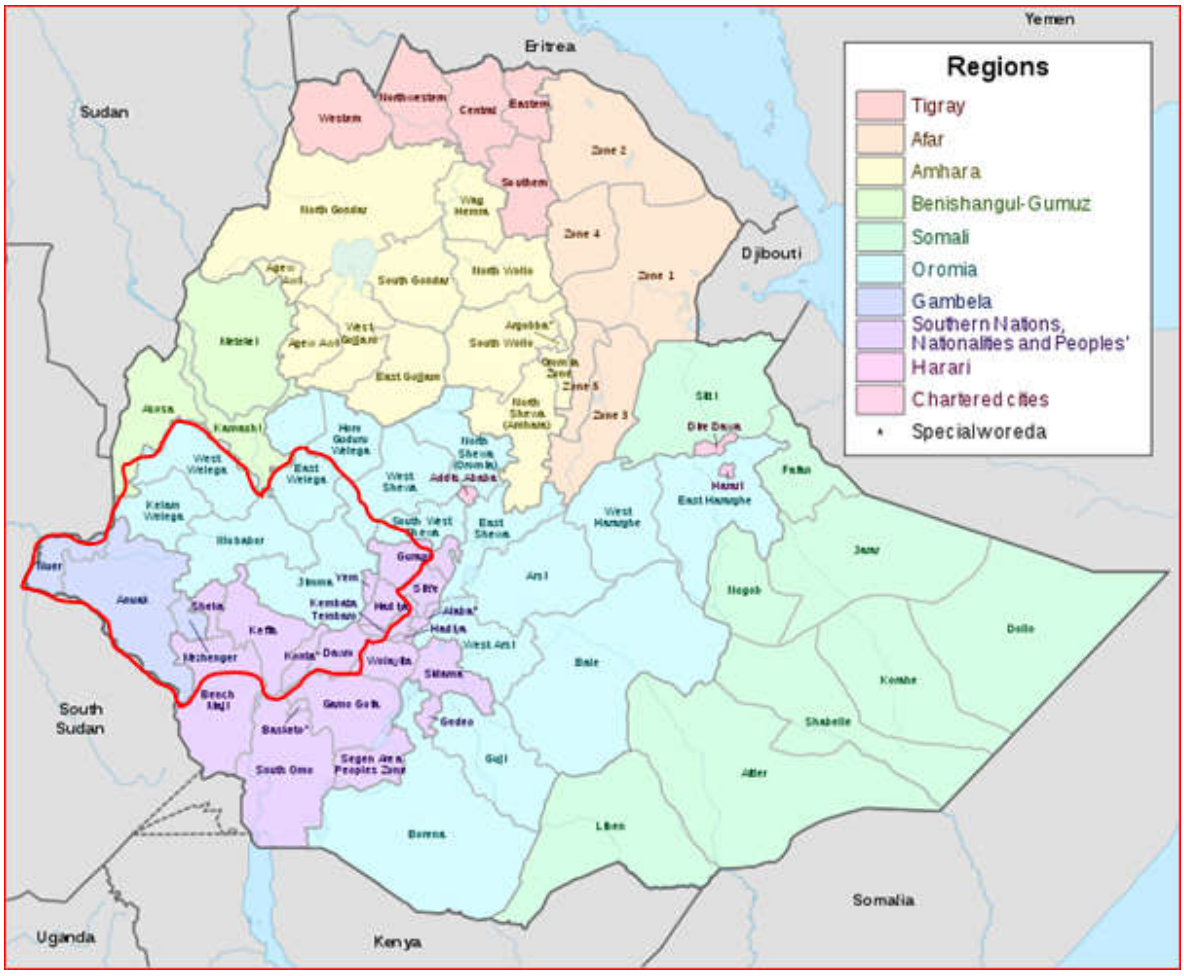


Figure 2 MAP OF THE STUDY AREA

4.2. Study design

Retrospective cross sectional study was undertaken in Jimma university medical center on biopsies submitted from September 11, 2013 to September 10, 2018

4.3. Populations

4.3.1. Target population

The Population of south west Ethiopia

4.3.2. Source population

All patients biopsy sent to JUMC Pathology Department from September 11, 2013 to September 10, 2018.

4.3.3. Study population

All oral and maxillofacial masses biopsy sent to JUMC Pathology department from September 11, 2013 to September 10, 2018

4.4. Sample size and sampling technique

All oral and maxillofacial masses biopsy fulfilling the inclusion criteria in the study period are included to make a descriptive study inclusive of the whole OMF mass samples sent to JUMC, pathology department, which was important to see the trend of OMF biopsies in each year clearly and the number of biopsy were 377 biopsies records from September 11, 2013 to September 10, 2018. Non probability convenience sampling method was used and all cases from September 11, 2013 to September 10, 2018 fulfilling the inclusion criteria are included on the study.

4.5. Data collection instrument

Data was collected using structured check lists that fulfill the objective of the study and recorded on the prepared checklists retrospectively by reviewing a histopathology report record of patients during the specified period. Four data collectors from histopathology technician was recruited and provided with two days training. Close supervision was made by the principal investigator every day and each filled checklist was checked for completeness. First, all biopsy records with oral and maxillofacial masses was filled on biopsy request form and logbook which are submitted during the study period. Finally, those biopsy records with oral and maxillofacial masses which fulfill the inclusion and exclusion criteria were reviewed.

4.6. Study variable

4.6.1. Independent variables

- Anatomic site
- Age
- Sex
- Year

4.6.2. Dependent variables

- Histopathologic diagnosis

4.7. Eligibility criteria

4.7.1. Inclusion criteria

All patients biopsy that come to histopathology department with oral and maxillofacial masses from September 11, 2013 to September 10, 2018

4.7.2. Exclusion criteria

Records of biopsy which misses histopathologic diagnosis and two of the following variables: age, sex, anatomic site was excluded from the study. There were 8 cases with no age and anatomic cases and two with no diagnosis which are excluded from the research.

4.8. Operational definition

Oral and maxillofacial region-------- consists of oral cavity and peri-oral soft tissues, mandible, maxilla, salivary glands, and zygomatic area boney and soft tissues.

OMF Mass --------- includes benign and malignant lesions including inflammation and cysts

Histopathology technique------- a gold standard technique used to diagnose based on microscopic structure of a tissue

Fibro-epithelial polyps…… includes fibrous epulis, fibroma and inflammatory polyps

Benign cyst …….. Includes all types of Odontogenic and non-Odontogenic benign cyst including inflammatory cyst, developmental cysts and retention cysts

4.9. Data processing and analysis

Immediately after the data collection is completed, the completeness and consistency of the data was checked then data was coded, edited and entered into computer software of Epi-data version 3.1 and then transported to SPSS version 22 for analysis. Descriptive analysis was done to describe number and percentages of the variables in the study. Data was cleaned, edited, compiled and described. Analysis was done using SPSS 22 version applied and result was presented using ration, frequency tables, graphs, pie-chart and chi-square test was done for each variables.

4.10. Data quality control

A Checklist which contains the variables of the study was prepared after reviewing different literatures and by adding my own adjustments. Pretest on checklist was done before the start of data collection and after checking the practicality of the check list, data collection was conducted. The principal investigator was following and supervising the data collection and documentation on the check lists. Consultation by senior pathologist was sought at time of some technical difficulties.

4.11. Ethical consideration

Ethical clearance was obtained from Institutional Review Board (IRB) of JUMC. Support letter request for Permission to conduct study was also submitted to pathology department by the investigator. During data extraction all records were retrieved by unique identification rather than the patient name to keep confidentiality.

4.12. Dissemination of the results

The results of this study will be disseminated or communicated to the Jimma University, Pathology and Dentistry departments including other concerned bodies through reports and publication on journals was also considered. There is no conflict of interest to mention on this research.

5. Results

5.1. Distribution of OMF masses in year

About 377 cases were identified to be diagnosed with oral and maxillofacial mass on the 5 years study period fulfilling the inclusion criteria. The minimum OMF biopsy record is in 2013/14, 24(6.4%) and the maximum OMF biopsy record was in 2017/18, 134(35.5) biopsies. Average OMF biopsy done on the five years period was 75 biopsies per year.

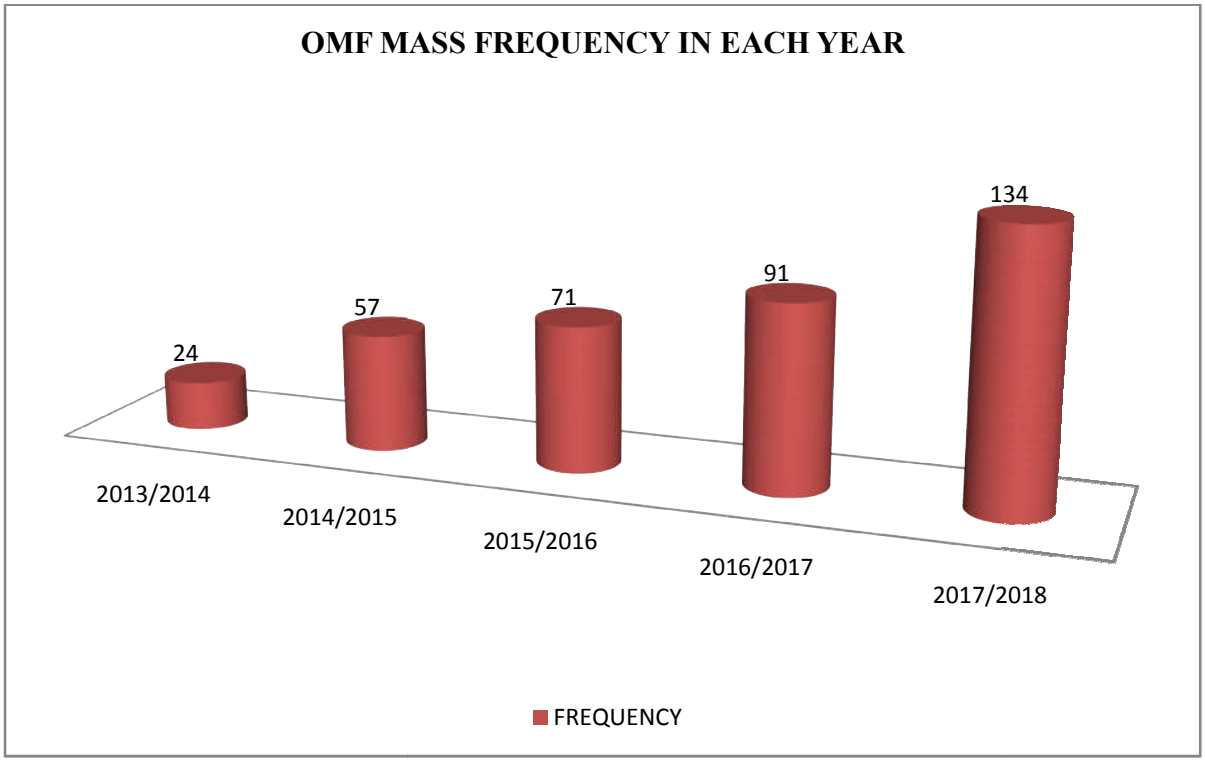


Figure 3 Frequency of OMF mass in each year in JUMC from 2013 to 2018

5.2. OMF mass histopathology with respect to age

Out of 377 patient's records, 194 (51.5%) of them were males and 183 (48.5) were females with a ratio of M:F=1:0.94 showing male dominance. The age distributions have minimum value of 1 year and maximum value of 85 years with median age of 30 and the mode was 30. The Maximum age distribution of OMF mass was in 17-40 years age range accounting 205 (54.4%) biopsies followed by age ≥ 41years with 113 (30%) biopsies and ≤ 16 years with 59(15.6%) biopsies. Both inflammatory and benign masses were common in the 17-40 years period but the malignant tumors were more common in older age, ≥ 41years, 49 cases. Dysplastic changes and inflammatory masses were seen more in age 17-40 and age greater than 40. Except surface epithelial tumors, which were common after the age 40years, all other OMF masses were common on age 17-40 years. The commonest masses in ≤ 16years were Mesenchymal tumors

30(50.8%) followed by benign cysts 13(22%) and inflammatory masses 7(11.9%). In age ≥ 40 the commonest tumors were surface epithelial tumors 40(35.4%) followed by Mesenchymal tumors 30(26.5) and salivary gland tumors 19(16.8%). The association of OMF mass with age of patient have a *p* value = 0.01 and this shows that there was a strong association between age and OMF mass showing increased frequency as the age increases.

Age category	Frequency	Percent (%)
≤16	59	15.6
17-40	205	54.4
≥ 41	113	30.0
Total	377	100.0

Table 1 Age distribution of OMF mass in JUMC from 2013 to 2018

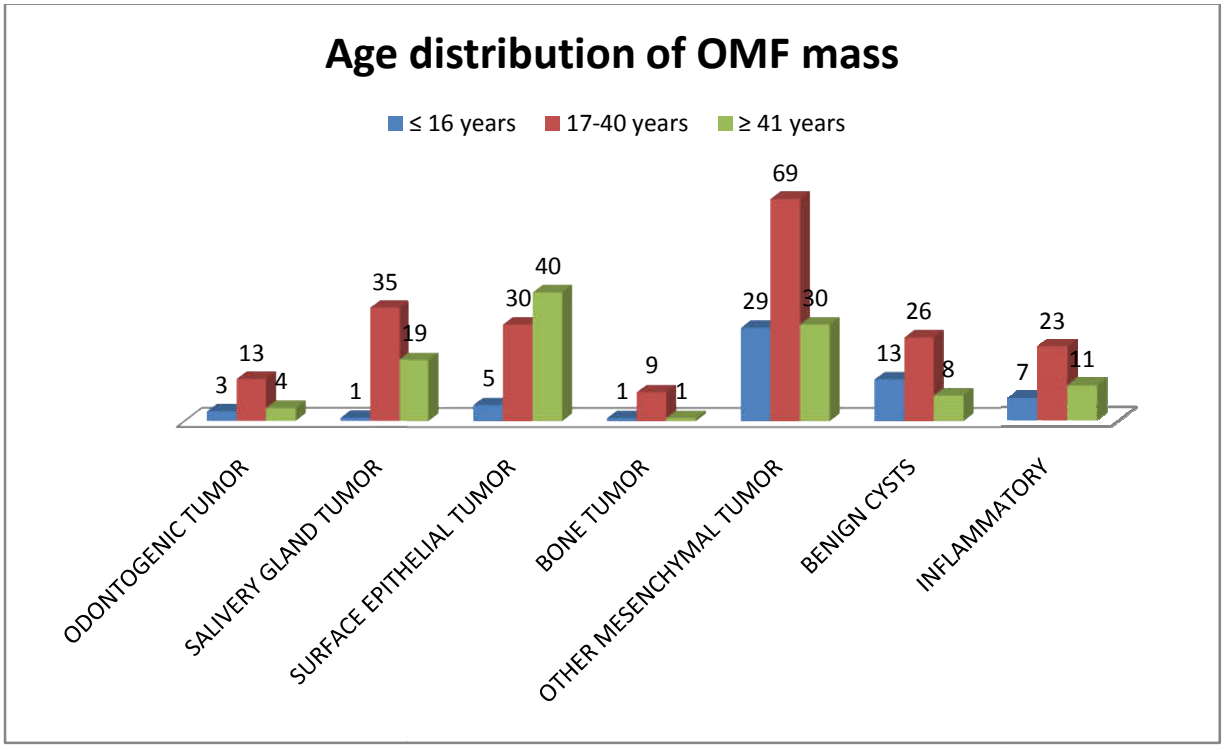


Figure 4 OMF mass category distributions with age group of the patients in JUMC from 2013 to 2018

5.3. OMF mass histopathology with respect to sex

Mesenchymal tumors, surface epithelial tumors, salivary gland tumors and inflammatory masses are more common in male than females but benign cysts were more common in females than males and odontogenic tumors have equal magnitude in both sex. In general OMF masses were more common in male than female. The association of sex with OMF mass have a p value= 0.48 showing weak association.

Table 2 OMF mass distribution with sex of the patients in JUMC from 2013 to 2018

Histopathologic category	MALE	FEMALE	Total	percentage
Odontogenic tumor	10	10	20	5.3%
Salivary gland tumor	33	22	55	14.5%
Surface epithelial tumors	43	32	75	19.9%
Benign cystic mass	23	24	47	12.5%
Inflammatory mass	24	17	41	10.9%
Bone tumor	6	5	11	2.9%
Other Mesenchymal tumors	55	73	128	34%
Total	194	183	377	100%
Percentage	51.5%	48.5%	100%	

5.4. Distribution of OMF masses with respect to anatomic site

OMF was common on the maxillary areas 79(21%) followed by mandible area 77(20.4%), buccal mucosa 50(13.3%), tongue 33(8.8%) and lips 30(8%). The remaining anatomic sites: palatine area, buccal mucosal area, parotids and other salivary glands occupy the remaining 108(28.6%).

Odontogenic tumors are common on mandible area 13(65%) followed by maxillary area 7(35%) and salivary gland tumors are more common on parotid gland 22(40%) followed by submandibular gland 10(18.2%) and minor salivary glands on the palatine area 9(16.4%). The remaining 17 (25.4%) are from other area minor salivary gland tumors. Surface epithelial tumors are common on tongue 23(30.7%) followed by buccal mucosa 19(25.3%) and lips 10(13.3%). Bone tumors are more common in maxilla 7(63.7%) than mandible 4(36.3%). Other

mesenchymal tumors are more common on maxillary area 33(25.8%) and mandibular area 32(25%) and buccal mucosa 23(18%). Inflammatory masses are common on submandibular gland 11(26.8) followed by lips 7(17.1%) and mandibular areas 6(14.6%). Maxillary area 17(36.2%) was the most common area for benign cysts followed by mandibular 15(31.9%) and naso-labial area 5(10.6%).the association of OMF mass and the anatomic site has a P value= 0.01 which is strong.

Table 3 OMF mass distribution with the anatomic site in JUMC from 2013 to 2018

	Anatomic sites											
histopathologic category	Naso-labial areas	Buccal mucosa	tongue	Palate	lips	maxillary area	Mandibular area	parotid gland	submandibular gland	other salivary gland tumors	total	Percent (%)
Odontogenic tumors	0	0	0	0	0	7	13	0	0	0	20	5.3
salivary gland tumors	2	2		9		3	2	22	10	5	55	14.5
surface epithelial tumors	7	19	23	2	10	9	5	0	0	0	75	19.9
bone tumor	0	0	0	0	0	7	4	0	0	0	11	12.5
other Mesenchymal tumors	15	23	7	6	11	33	32	0	0	0	128	10.9
inflammatory masses	0	5	2	1	7	3	6	3	11	3	41	2.9
benign cysts	5	1	1	2	2	17	15	1	1	2	47	34
total	29	50	33	20	30	79	77	26	22	10	377	100
Percent (%)	7.7	13.2	8.8	5.3	8	21.2	20.4	6.9	5.8	2.7	100	

5.5. Distribution of OMF mass with histopathologic type

The 377 biopsies of OMF were categorized into odontogenic tumors, salivary gland tumors, surface epithelial tumors, bone tumor, benign cystic mass, other mesenchymal tumors and inflammatory mass. Mesenchymal tumours, other than bone tumor, have the highest number of 128 (33.9%) cases followed by surface epithelial tumors, 75(19.9%) and the least numbers of OMF biopsy was bone tumor with 11(2.9%) cases.

From the odontogenic tumors 20(5.3%), Ameloblastoma 17(85%) is the commonest followed by Odontoma, 2(10%) and Amiloblastic carcinoma, 1(5%). From the 55(14.6%) salivary glands biopsy pleomorphic adenoma 31(56.4%) is the commonest followed by adenoid cystic carcinoma 9(16.4%) and mucoepidermoid carcinoma 8 (14.5%); the others are Acinic cell carcinoma 4(7.3%), Warthins tumor 1(1.8%) basal cell Adenocarcinoma 1(1.8%) and polymorphous low grade Adenocarcinoma 1(1.8%).

From the surface epithelial tumors, accounting 75(19.9%) of total OMF, the most common is squamous cell carcinoma 56(74.7%) followed by papilloma 14(18.7%), dysplastic changes 4(5.3%) and pseudoepithelomatous hyperplasia 1(1.3%).

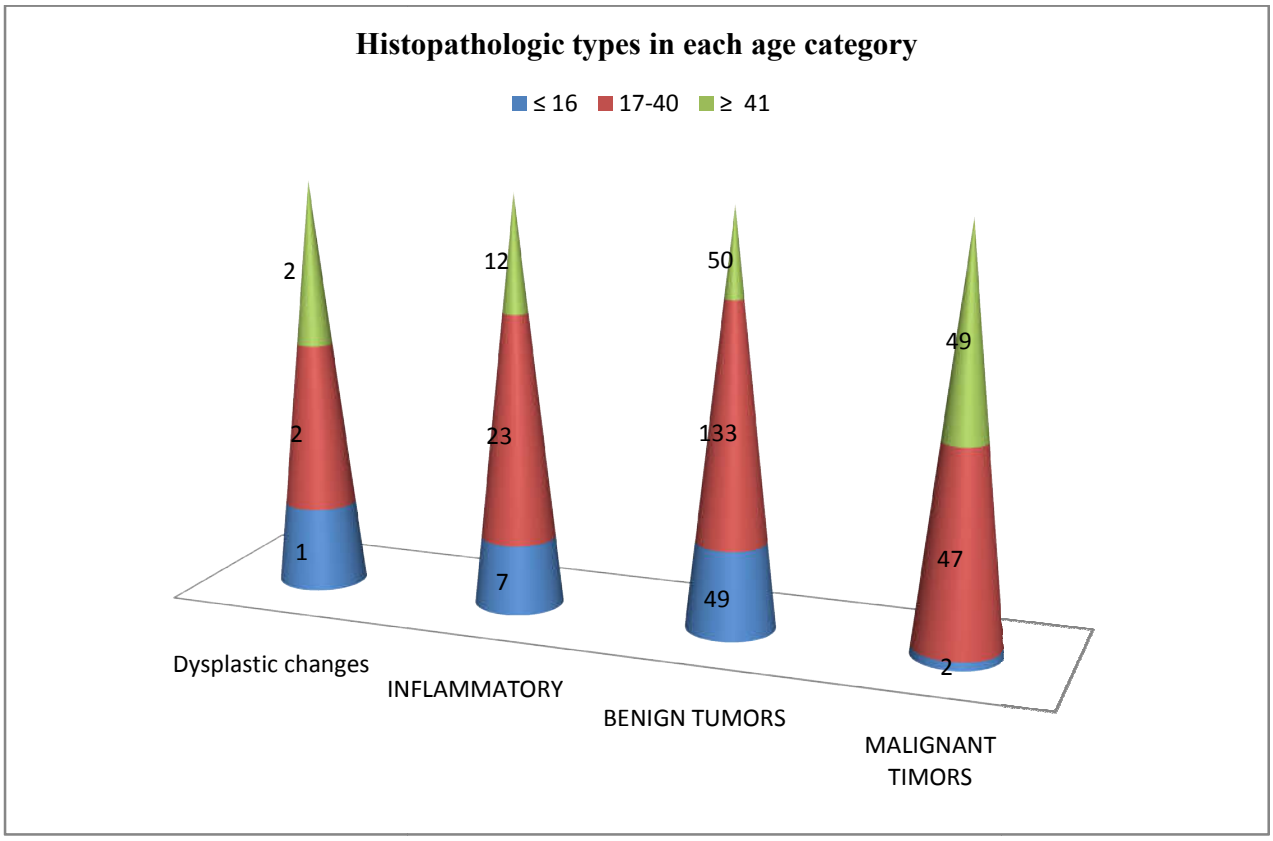


Figure 5 frequency of MOF mass in each age group in JUMC from 2013 to 2018

From the bone masses 11(2.9%) the most common is Osteosarcoma 8(72.8%) followed by Osteoma 2(18.2%), Central giant cell tumor 1(9%). From other types of mesenchymal tumors 128(33.9%), fibro epithelial tumors 53 (41.4%) are the most common, followed by Pyogenic granuloma 19(14.8%) and ossifying fibroma 18(14.1%), the least is schwannoma 1(0.8%). From 41(10.9%) cases of inflammatory masses, the commonest is chronic non-specific inflammation 21(51.2%) followed by chronic sialoadenitis 17(41.5%) and chronic osteomylities 3(7.3%). From benign cysts accounting 47(12.5%), the most common is dentigerous cyst 7(14.9%) followed by mucocele 6(12.8%) and odontogenic keratocyst 5(10.6%).

From the all OMF biopsies of in the study period, the benign tumors are the most common tumor type, 233(61.5%) followed by malignant tumors, 98(26%) then inflammatory masses and intra epithelial lesion 41 (11.1%) and 5 (1.3%) respectively.

From the benign tumors fibroepithelial polyp 53(22.8%) is the most common, followed by pleomorphic adenoma 31(13.4%), Pyogenic granuloma 19(8.2%) and Ameloblastoma 15(6.5%).

From the malignant tumors and from carcinomas, squamous cell carcinoma 56(57.1%), is the leading followed by adenoid cystic carcinoma 9(9.2%), mucoepidermoid carcinoma 8(8.2%) and Acinic cell carcinoma 4(4.1%).

From sarcomas osteosarcoma 8(8.2%) is the commonest one followed by Fibrosarcoma 3(3.1%) and Rhabdomyosarcoma 3(3.1%)

Table 4 OMF mass histopathologic category with respect to the anatomic site in JUMC from 2013 to 2018

HISTOPATHOLOGIC CATEGORY	SITE OF THE MASS										Total	Percent (%)
	NASAL AREA	BUCCAL MUCOSA	TONGUE	PALATE	LIPS	MAXILLARY AREA	MANDIBULAR AREA	PAROTID GLAND	SUBMANDIBULAR GLAND	OTHER SALIVERY GLANDS		
DYSPLASTIC CHANGE	1	1	3	0	0	0	0	0	0	0	5	1.4
INFLAMMATORY	0	5	2	1	7	3	6	3	11	4	41	11.1
BENIGN TUMORS	21	22	11	15	16	56	63	15	8	5	233	61.5
MALIGNANT TIMORS	7	22	17	5	7	20	8	8	3	1	98	26
TOTAL	29	50	33	21	30	79	77	26	22	10	377	100
Percent (%)	7.7	13.3	8.7	5.5	8	21	20.4	7	5.7	2.7	100	

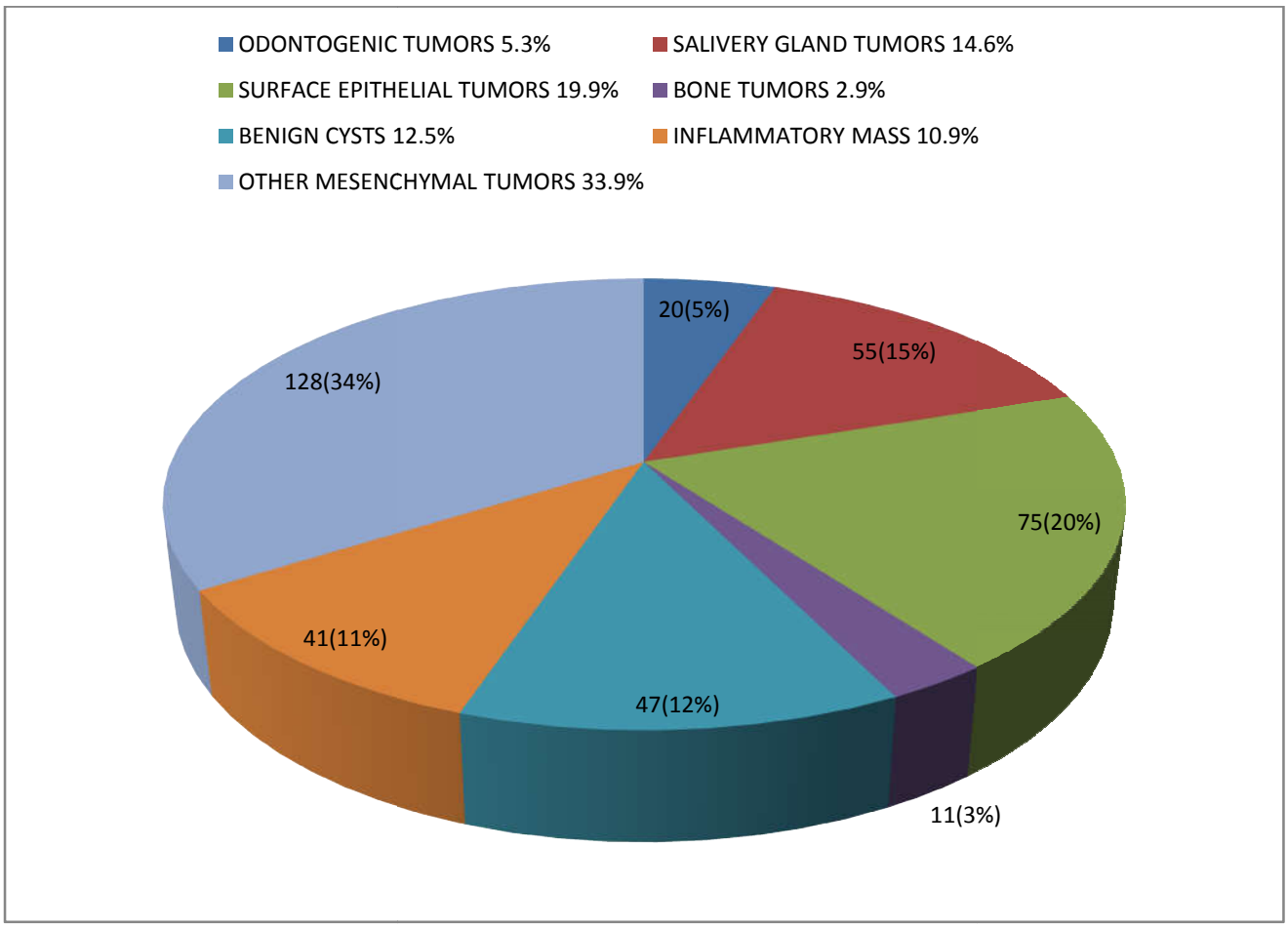


Figure 6 Frequency of OMF mass category distribution in JUMC from 2013 to 2018

6. DISCUSSION

The five years study period result shows that there was an increased in the number of oral and maxillofacial masses throughout the consequent years continuously. This might be because of increasing service number and quality implementation in pathology department of JUMC and maxillofacial surgery service of dentistry additionally; increasing health seeking condition of the society has major role.

With regards to sex distribution, out of 377 patient's record 194 (51.5%) were male and 183 (48.5) were female with a ratio of M:F=1.06:1 showing increased male dominance. Similar dominance in number of males was seen in A retrospective analysis, done in Bangladesh teaching hospital [25] and A retrospective research done in Nigeria on 2014 [12]

The age distributions have minimum value of 1 year and maximum value of 85 years with median of 30 years. The Maximum distribution was seen in17-40 years age range 205 (54.4%) followed by age ≥ 41years, 113(30%) and ≤ 16 years 59(15.6%). Similar result was seen on a retrospective study of oral and maxillofacial pathology in Jeddah with slight difference on the minimum age of the patient and the median which is 5 month and 35 respectively [26] and in research done in St. Paule hospital also shows similar second and third decades of age as common presentation period [14].

On the site of OMF mass, this research shows the commonest area to be the maxillary areas 79(21%) followed by mandible area 77(20.4%) and Buccal mucosa 50(13.3%) and similar finding is seen on a retrospective study in Nigeria [8]. But in Ethiopia, the one done in St. Paule hospital, shows different pictures and the commonest site to be mandible followed by maxilla and buccal mucosa [14].

But Odontogenic tumors were common on mandible area 13(65%) followed by maxillary area 7(35%) and Ameloblastoma17(85%) is the commonest odontogenic tumor which has a similar finding with the Tanzania, Muhimbili national hospital, research [4], and on the St. Paule hospital research Odontogenic tumors in Ethiopia: eight year retrospective study[19].

Salivary gland tumors were the second most OMF mass and constitutes 14.6% and similar finding is seen in Iraq 42.6% were salivary gland tumors following to Odontogenic tumors and mesenchymal tumors [9] and in Nigerian research 37.7% following to mesenchymal tumors and surface epithelial tumors [8]. But this finding differ with the result of Brazilian southwestern population research result which the commonest tumor of OMF and constitutes 37.1% [9].

Commonest area of salivary gland tumors was on parotid gland 22(40%) and the research done in St. Paule hospital also showed parotid gland pleomorphic adenoma (11.88%) as the commonest salivary gland tumor similar results are seen in Tanzania 10% [4] and in Nigeria 1.4% [12].

Surface epithelial tumors were the second commonest OMF mass, accounting 75(19.9%) of total OMF and squamous cell carcinoma 56(74.7%) was the first in the category, conceding with South-Western Saudi Arabia research result on which Oral squamous cell carcinoma was the most common surface epithelial tumor, contributing to 36.1% [15] and similar result seen on Tanzania (62.2%) [19], Taiwanese patient's [16] but in St. Paule hospital study it is the third tumor having (11.60%)[14].

Bone tumors have 11(2.9%) magnitude with the commonest one of it was Osteosarcoma 8(72.8%) and mandibular bone was commonly involved than the maxilla. Similar find was seen in Nigeria with osteosarcoma having 9(11.7%) and the commonest bone tumor[8] in Nigeria 5(3.5%) [12]And in Tanzania 11(2.8%) [19] And in Ethiopia, St. Paule hospital 4(1.10%)[14].

From benign cysts accounting 47(12.5%), the most common was Dentigerous cyst 7(14.9%) and similarly it was common in Iraq 5.5% [22] and in Tanzania 37(6.3%)but I Australia it was the second most common 4.1% following to radicular cyst 9.5%[7].

Mesenchymal tumors, other than bone tumor, was the most common OMF masses 128(33.9%), and of it, fibro epithelial tumors 53 (41.4%) was the first in magnitude. This is also true for Australia with 965(15.2%) [7] And in Brazil (5.6%) [9].

From 42(11%) cases of inflammatory masses, the commonest was chronic non-specific inflammation 21(51.2%) followed by chronic sialoadenitis 17(41.5%) which was similar with Taiwanese patient's [16]. But in Brazilian chronic sialoadenitis 13(1.5%) is the commonest inflammatory OMF lesion [24].

On this research, the commonest OMF masses diagnostic category was benign tumors 233(61.6%) followed by malignant tumors 98(26%) then inflammatory masses 42(11%) and dysplastic changes 5(1.4%). In Nigerian research shows similar finding with benign tumors the most common accounting 86.3% and malignant tumors 13.7% [12]. But the finding of Saudi Arabia research differs with predominance of the non- neoplastic lesions accounting (50.3%) and a neoplastic (49.7%) [15] And in Taiwanese patient's, Most of the lesions were in the inflammatory/infective group, followed by tumour/tumour-like reactive lesions [16].

From the benign tumors fibroepithelial tumor 53(22.8%) was the commonest followed by pleomorphic adenoma 31(13.4%), Pyogenic granuloma 19(8.2%) and ossifying fibroma 18(7.8%). But in the East African research it showed Ameloblastoma (9.23%), fibroma (7.3%) and pleomorphic adenoma (4.95%) [21] And St. Paul's Hospital, Addis Ababa, Ethiopia, the most frequent oral and maxillofacial lesions were Ameloblastoma (16.02%), pleomorphic adenoma (11.88%)[14]. This difference can be because of socio-demographic variable nature of the OMF mass even in the same country but different areas.

From the malignant tumors and from carcinoma squamous cell carcinoma 56(57.1%), is the leading followed by adenoid cystic carcinoma 9(9.2%), mucoepidermoid carcinoma 8(8.2%) and

Acinic cell carcinoma 4(4.1%) and in Dares Salaam, Tanzania research shows a similar predominance by Squamous cell carcinoma (62.2%) followed by Kaposi's sarcoma (13.1%) and adenoid cystic carcinoma (7.4%) [17]And in Ghana shows squamous cell carcinoma 62%, was the commonest [18], In Nigeria squamous cell carcinoma 36.3% was the most common malignant tumor[12].In Nigeria at academic medical hospital shows 37.8% diagnosed as malignancies, and Squamous cell carcinoma 35.1% was the most common malignancy [8].In St. Paul's Hospital research shows, from the carcinomas, squamous cell carcinoma (11.60%)as the most common carcinoma [14].

From sarcomas, Osteosarcoma 8(8.2%) was the commonest one followed by Fibrosarcoma 3(3.1%) and Rhabdomyosarcoma 3(3.1%) similarly in Nigeria Osteogenic sarcoma 11.7% was the most commonly diagnosed sarcoma.[8] but, in an East African population research shows Kaposi's sarcoma (21.98%), as the commonest followed by Burkitts lymphoma (20.45%), and squamous cell carcinoma (15.22%) [21] And In St. Paul's Hospital research shows, from the sarcomas, Kaposi's sarcoma (3.31%) was the leading followed by Osteosarcoma (1.1%)[14]. Similar explanation can be possible; this difference can be because of socio-demographic variable nature of the OMF mass even in the same country but different areas.

7. Conclusion

The result of this research shows the distribution of oral and maxillofacial tumors varies with the age, sex and anatomic site of the mass. OMF mass is common on the early adult age period and the risk of malignant tumors increases in those with age ≥ 41years and the commonest malignant tumor is squamous cell carcinoma but in children and adolescents benign tumors specially fibroepithelial polyps are the commonest. In children less than 16 years inflammatory conditions are common followed by Odontogenic tumors. The commonest site of OMF is maxillary area but for Odontogenic tumors, mandible is the commonest one and males have more preponderance for OMF than females.

8. Recommendation

- The result shows as the age increases the rate of malignant neoplastic masses also increases. As a result, we recommend health awareness creation programs at least for those with age >40 years having OMF mass by the minister of health.
- Health education program must be prepared and given for the population in study area by federal and regional health bureau including JUMC to improve further health seeking practices which is helpful for early detection and management of OMF mass.
- As the burden is increasing yearly, further research is recommended to find the risk factors and their association; by interested researchers.

9. References

1. Vinaykumar, Abul k abbas, Jon caster. 'Robbins and cotran pathologic basis of disease'. (Ninethed.). : Elsevier Inc; 2015. 727-745
2. Leon barnes, John w eveson, Peter reichart, David sidransky. 'World Health Organization Classification of Tumors, Head and Neck Tumours.' (2nd ed.). France: Team Rush 69603 Villeurbanne; 2005.
3. José alcidesalmeida de arruda, leniverônica de oliveirasilva, laurenfrenzelschuch, alinecarvalhobatista. Oral and maxillofacial malignant lesions in children and adolescents in the Brazilian population. ELSEVIER. 19 December 2017.;75(1): 38-42.
4. Jeremiah moshy and karpalsohal. The types, incidence and demographic distribution of oral and maxillofacial neoplasms among patients attending Muhimbili National Hospital in Tanzania. Tanzania Journal of Health Research. April 2016; 18(2): 45–52.
5. Leniverônica de oliveirasilva, joséalcidesalmeidaarruda, stephaniejoanamartellicamila de nazaréalves de oliveirakatolaizfernandamendesnunesanacarolinauchoavasconcelossandrabeatrizchavestarquinio, anapaulaneutzlinggomes, ricardosantiagogomez, ricardoalvesmesquita, marciamariafonseca da silveira, anapaulaverassobral. A multicenter study of biopsied oral and maxillofacial lesions in a Brazilian pediatric population. Braz Oral Res. 2018;32(20).
6. Robert e marx, dds, Diane stern, dds. 'Oral and maxillofacial pathology.' (1st ed.). Miami, Florida: Quintessence Publishing Co, In; 2003.
7. E kelloway. 'A retrospective analysis of oral and maxillofacial pathology in an Australian adult population.' Australian Dental Journal.2014; 59(10): 215–220.
8. Ibikunle AA, Taiwo AO, Braimah RO. 'Oral and maxillofacial malignancies: An analysis of 77 cases seen at an academic medical hospital.' J OrofacSci 2016; 8:80-5.
9. Alinepriscilaataíde, Felipe paivafonseca, Alan roger santossilva, Jacks jorgejúnior, Marcioajudarte lopes. 'Distribution of oral and maxillofacial lesions in pediatric patients from a Brazilian southeastern population.' International Journal of Pediatric Otorhinolaryngology.2016; 1(90): 241-244.
10. Mohitgupta, Hansachoudhary, Neelugupta, Aahanagupta. 'Histopathological study of neoplastic lesions of oral cavity and oropharynx.' International Journal of Research in Medical Sciences. 2016 May;4(5): 1506-1510.
11. Kilinc A, Saruhan N, Gundogdu B, Yalcin E, Ertas U, Urvasizoglu G. 'Benign tumors and tumor-like lesions of the oral cavity and jaws: An analysis of 709 cases'. Niger J ClinPract 2017;20:1448-54
12. Bassey go, Osundeod, Anyanechice. 'Maxillofacial tumors and tumor-like lesions in a Nigerian teaching hospital: an eleven year retrospective analyses'. African Health Sciences. 2014;14(1): 56-63.

13. Sohalks, Moshyjr. 'Six year review of malignant oral and maxillofacial neoplasms attended at Muhimbili National Hospital, Dar es Salaam, Tanzania'. East and Central Africa Medical Journal . August 2017;3(1): 35-38.
14. Ermiasdereje ,Amareteshome , Mulualemtolosa , Yosanmulata. 'Orofacial Neoplasm In Patients Visited St Paul's Hospital, Addis Ababa, Ethiopia'. Journal of Applied Dental and Medical Sciences. January - March 2016;2(1): 2454-2288.
15. Sanaa m saleh, Ali m. idris, Nandimandalam v vani, Faisal m tubaigy, fahd a alharbi, feborl-hns. 'Retrospective analysis of biopsied oral and maxillofacial lesions in South-Western Saudi Arabia'. Saudi Medical Journal. 2017;38(4): 405-412.
16. Frank lei , Jing-yichen, wen-chenwang, li-min lin, Hsien-chenghuang . 'Retrospective study of oral and maxillofacial lesions in older Taiwanese patients'. Gerodontology. February 2014; 32(4): 281-287.
17. Sohalks, Moshyjr. 'Six year review of malignant oral and maxillofacial neoplasms attended at Muhimbili National Hospital, Dar es Salaam, Tanzania'. East and Central Africa Medical Journal. 2017; 3(1): 35-38.
18. Grace eaparkins, georgearmah, Patrick ampofo. 'Tumours and tumour-like lesions of the lower face at Korle Bu Teaching Hospital, Ghana – an eight year study'. World Journal of Surgical Oncology. 7 May 2007;5(1): 48.
19. Bruktawitkebede, Dawit tare, Birkebogale, Fessahaye alemseged. 'Odontogenic tumors in Ethiopia: eight years retrospective study'. BMC Oral Health. December 2017; 17(1):40.
20. Dr f butt, dr j bahra, dr e dimba,prof j ogengo, prof chindia, dr e waigayu. 'The pattern of benign jaw tumours in a university teaching hospital in kenya: (a 19-year audit)'. Open Journal of Stomatology. January 2012; 10(1): 4236.
21. Adriane kamulegeya and boniphace m kalyanyama. 'Oral maxillofacial neoplasms in an East African population a 10 year retrospective study of 1863 cases using histopathological reports'. BMC Oral Health. 2008;8(1): 19.
22. Yakin m, jalalja, al-khurri le, rich am. 'Oral and maxillofacial pathology submitted to Rizgary Teaching Hospital: a 6-year retrospective study'. International Dental Journal. January 2016;66(2).
23. Ergicho b, ergisho b. 'Pattern of salivary gland tumors in Ethiopia and non-western countries. Ethiopian medical journal'. August 2003; 41(3):235-244.
24. Camilaportopesso, te ´ciadaltroborgesalves, niltonce ´sarnogueira dos santos , heloı ´salaı ´s rosa ´rio dos santos, alana de ca ´ssiasilvaazevedo, jean nunes dos santos , ma ´rciocamposoliveira. 'Epidemiological survey of oral lesions in children and adolescents in a Brazilian population'. International Journal of Pediatric Otorhinolaryngology. 2015;79(1): 1865-1871.
25. Islam ma, hossain ma, rahman s b, kawser ma, rahmanms. Maxillofacial tumors and tumor-like lesions: a retrospective analysis. Update Dental College Journal. 2018;8(1) .

26. Nada a alhindiamal m sindi nada o binmadiwael y elias. A retrospective study of oral and maxillofacial pathology lesions diagnosed at the Faculty of Dentistry, King abdulaziz University. Dove Medical Press Journal. 2019; 11(1): 45–52.

10. Appendices/Annexes

Annex-1:- List of Dummy tables

Table 5 OMF mass diagnostic category in JUMC from 2013 to 2018

Histopathologic category						
Odontogenic tumors	Salivary gland tumors	Surface epithelial tumors	Bone tumor	Other Mesenchymal tumor	Inflammatory masses	Benign cystic masses

Table 6 Year of biopsy done with age and sex in JUMC from 2013 to 2018

Year	Age	Sex	
		Male (M)	Female (F)
2013/14			
2014/15			
2015/16			
2016/17			
2017/18			

Table 7 Age category of OMF mass in JUMC from 2013 to 2018

Age of the patient category		
≤ 16 years	16-40 years	≥ 40 years

Table 8 category based on histopathologic type in JUMC from 2013 to 2018

Histopathologic category			
Inflammatory mass	Dysplastic change	Benign tumor	Malignant tumor

Table 9 Anatomic site of OMF mass in JUMC from 2013 to 2018

Anatomic site of the lesion								
Nasal area	lips	Buccal area	Maxillary area	Mandibular area	Palatine area	Parotid gland	Submandibular gland	Other salivary glands

Annex-2: Approval

ASSURANCE OF PRINCIPAL INVESTIGATOR

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of the Faculty of Medical sciences in effect at the time of grant is forwarded as the result of this application.

Name of the investigator: _____

Date _____Signature_____

APPROVAL OF THE FIRST ADVISOR:

Name of the first advisor: _____

Date _____ Signature_____

APPROVAL OF THE SECOND ADVISOR:

Name of the second advisor: _____

Date _____ Signature_____