

Prevalence of Oral Lesions – A Multi Centered Study

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Abstract

Oral health is essential to general health and quality of life. It is a state of being free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual's capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing.

It is a norm for a dentist to perform oral examination on every patient arriving to the clinic. But it is unfortunate that the term "oral examination" usually incorporates dental or periodontal examination only, while, proper oral mucosal and hard tissue examination is a rarity in dental practice. This enhances the risk of failing to identify potentially health compromising or life threatening oral lesions.

Keywords: Oral Lesions; Oral Examination; Oral Mucosal Lesions

Literature Review

Numerous studies have been conducted throughout the world to assess the prevalence of oral mucosal lesions [1-3]. But only a handful of studies have assessed the prevalence of oral mucosal lesions in Saudi Arabia [4-6].

Two of the Saudi based studies assessed the prevalence of specific type of oral mucosal lesions such as inflammatory hyperplasia [4] and cystic lesion [5]. However, a study was conducted to assess the prevalence of the entire array of oral lesions in Saudi patients. According to this study the most commonly encountered oral mucosal lesion was Fordyce granules followed by Leukoedema [6]. We believe that further studies of such nature need to be conducted in Saudi Arabia so that a better understanding could be developed regarding the prevalent oral lesions in Saudi Arabia which could aid health care authorities in creating awareness on a national level to the masses regarding potential risk factors and to the health care professionals regarding management of the prevalent oral lesions.

Recently, the prevalence of the entire array of oral lesions in Saudi patients was assessed. According to this study the most commonly encountered oral mucosal lesion was Fordyce granules followed by Leukoedema [6].

Smokeless tobacco habits in Saudi Arabia exist and the possible correlations with oral cancer have been indicated (Allard, *et al.* 1999).

There are several studies that correlated shamma to relatively high incidence of oral cancer in south-western region (Gazan) of Saudi Arabia (Zahrán and Jamjoom, *et al.* 198), (Yousef and Hashash, 1983), (Salem, *et al.* 1984), (Amer M., *et al.* 1985) (El Akkad, *et al.* 1986).

Aim of this Study

To assess the type and prevalence of oral soft and hard tissue lesions in dental patients arriving at two dental centers in Riyadh namely “Riyadh colleges of Dentistry and Pharmacy” (RCDP) and “shamesi hospital” (King Saud Medical City - KSMC).

Objectives of this Study

- To take a detailed history of dental patients arriving at RCDP and KSMC via a self-prepared oral lesions data collection form
- To examine these patient for the purpose of determining the presence of oral lesions
- Wherever required to take a biopsy or conduct any other investigation to diagnose undiagnosed lesions
- To determine the prevalence of oral lesions in all the examined RCDP and KSMC patients.

Materials and Methods

Study Design: It is a cross sectional survey based study.

Study Site: This study was conducted at two different health care centers; namely Riyadh Colleges Of Dentistry and Pharmacy (at 3 campuses; namely Al-Numetejeyah, Al-Olaya and Al-Muneseyah campus) and Shamesi Hospital (King Saud Medical City) in Riyadh (the capital city of Saudi Arabia). Al-Numetejeyah campus of RCDP is located on King Fahd Road, the Olaya campus of RCDP is located on Olaya Road, Muneseyah Campus of RCDP is located on Dammam Road, while, Shamesi Hospital (KSMC) is located at Shamesi region of Riyadh.

Study Population: The subjects of this study were patients arriving in dental clinics at the above-mentioned centers.

Sample Size: Sample size was 2366 patients.

Sampling Technique: A simple random sampling technique was utilized in which each patient was randomly selected regardless of differences in racial, sociodemographic and clinicopathological factors.

Inclusion Criteria

- Patients arriving in the above-mentioned RCDP and KSMC dental clinics
- Within the age of 2 - 80 years
- Both genders were included

Exclusion Criteria

- Patients in which intra oral examination was not possible due to trismus ($I/I = \text{or} < 5\text{mm}$)
- Unconscious patients
- Psychologically unstable patients
- Patients with recent oral and maxillofacial trauma history

Data Collection Method

To maintain inter-examiner reliability a session of lectures was conducted before initiation of this study in which all the research members took notes and discussed various oral lesions.

The purpose and steps involved in this study were explained to each patient before taking an informed consent and examining the patient. Any patient who did not fill the informed consent was not included in this study. In case of a pediatric patient informed consent was taken from the parents or adult attendants. The name of subjects was not asked to maintain confidentiality. All the data was collected

via a self-prepared oral lesions data collection form and intraoral/extraoral clinical examination. A level 12 dental student performed both the tasks.

The data form was filled by the examiner before performing the clinical examination. The form comprised of following sections: “sociodemographic”, “medical history”, “drug history”, “allergy history” and “oral examination”.

After filling the data form clinical examination was performed. The clinical examination comprised of both extra oral and intra oral examination. The clinical examination was performed on a dental chair with well illuminated artificial light. Universal precautions was taken while examining each patient. The armamentarium for clinical examination comprised of a mouth mirror, dental explorer, periodontal probe, tweezers and cotton gauze. All the instruments were sterilized before each examination. In case a lesion was detected on clinical examination the description about the clinical appearance and the diagnosis of the lesion / condition was mentioned by the examiner in the data collection form. A picture of every oral lesion / condition was taken for the purpose of discussion with other examiners and research supervisor. In addition to that an OPG (orthopantomogram panoramic x-ray) was taken for every patient.

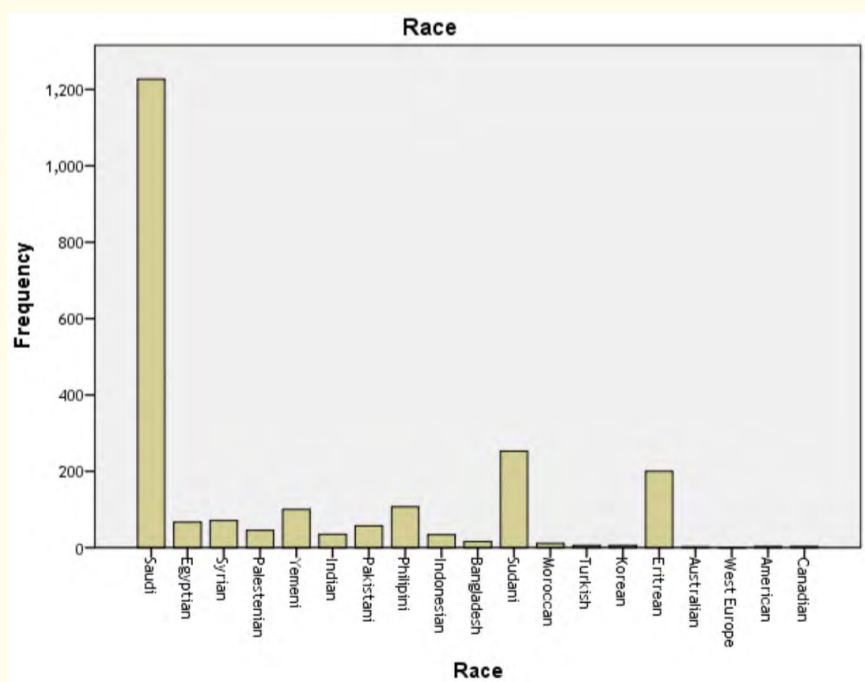
Wherever necessary a surgical biopsy was performed for undiagnosed lesions. Armamentarium for surgical biopsy comprised of local anesthesia (with / without epinephrine), no.15 surgical blade, scalpel, tissue forceps, formalin solution filled bottle and non-absorbable silk suture. A biopsy referral form was filled for the purpose of sending the biopsy sample for histological examination.

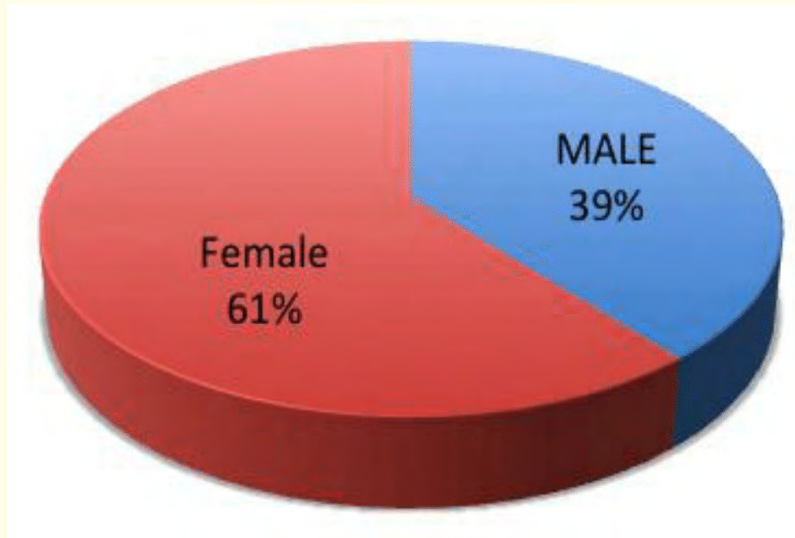
Statistical Analysis

Statistical Package for the Social Sciences (SPSS-20 version) was used for statistical analysis. Frequency distribution was performed to assess frequency of occurrence of oral mucosal lesions in the subjects. Chi square test was performed to determine the relationship between independent variables such as age, gender, education, occupation, medical/drug/allergy history, risk factors with dependent variable namely oral mucosal lesions. A Kappa Statistics (k) was performed to measure the degree of agreement among the examiners. A non-parametric t-test was performed to compare prevalence of oral lesions between RCDP and KSMC.

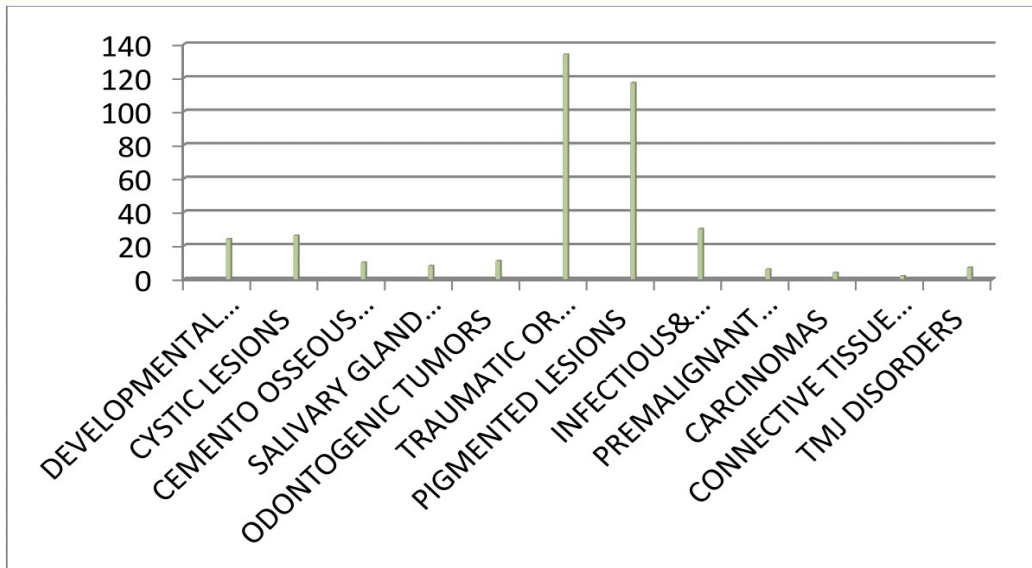
Results

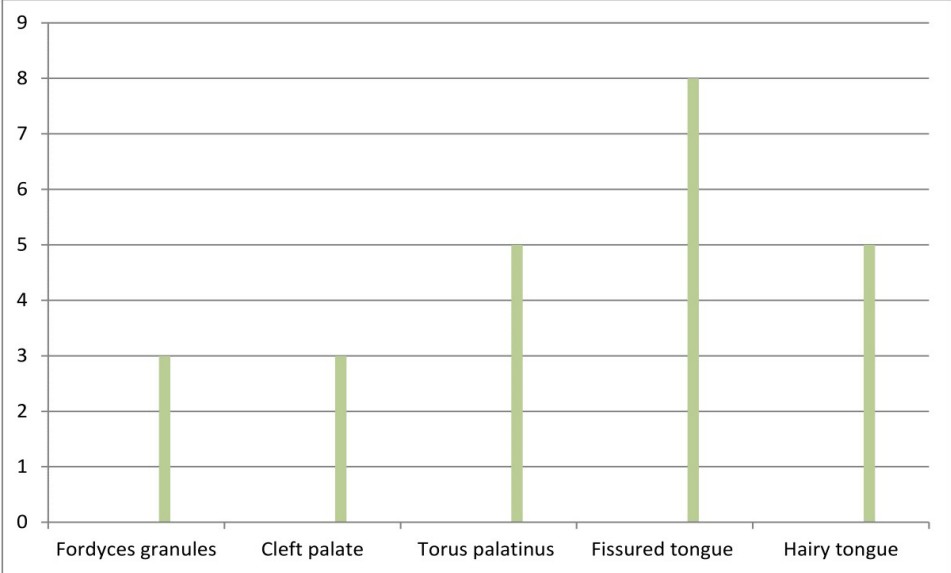
Among 387 patients who were diagnosed with oral lesions, females comprised 58% (n = 236) and males 42% (n = 151). The age range was between 1 to 98 years; most commonly affected being 24 to 36 years. The most common nationality was Saudi (n = 1227) (Figure 1). As shown in Table 1, the most prevalent lesion was linea alba (n = 128) (5.4% of sample size), followed by racial pigmentation (n = 115). Other diagnosed lesions in descending order of frequency were fissured tongue (n=8), facial space infection (n = 8), mucocele (n = 7), odontoma (n = 7), leukoplakia (n = 6), radicular cyst (n = 6), aphthous ulcers (n = 6), geographic tongue (n = 5), hairy tongue (n = 5), torus palatinus (n = 5), pyogenic granuloma (n = 5), coronoid hyperplasia (n = 5), keratocyst (n = 4), dentigerous cyst (n = 4), cemento osseous dysplasia (n = 4), periapical granuloma (n = 4), osteomyelitis (n = 4), ameloblastoma (n = 3), fordyce granule (n = 3), cleft palate (n = 3), cementoma (n = 3), pleomorphic adenoma (n = 3), amalgam tattoo (n = 2), incisive canal cyst (n = 2), idiopathic sclerosis (n = 2), denture stomatitis (n = 2), lipoma (n = 2), squamous cell carcinoma (n = 2), TMJ ankylosis (n = 2), sialadenitis (n = 2), followed by Myofascial Pain Dysfunction Syndrome, condensing osteitis, ameloblastic fibroma, lateral periodontal cyst, metastatic breast carcinoma, ossifying fibroma, globulomaxillary cyst, ranula, osteoma, clear cell carcinoma, sjogrens syndrome, orbital cellulitis, osteosarcoma and sialolithiasis (n = 1).



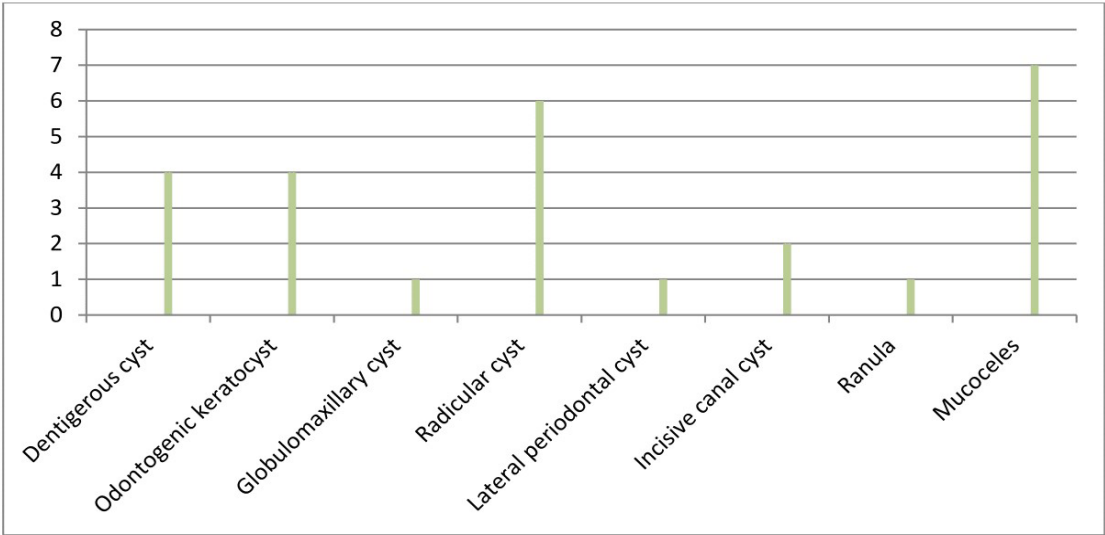


- 379 patients were diagnosed with oral lesions

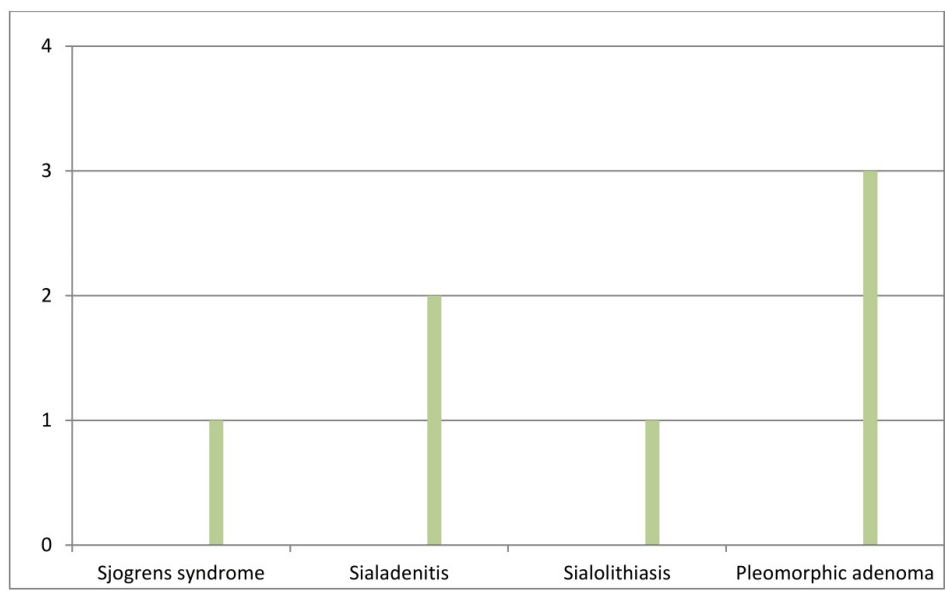
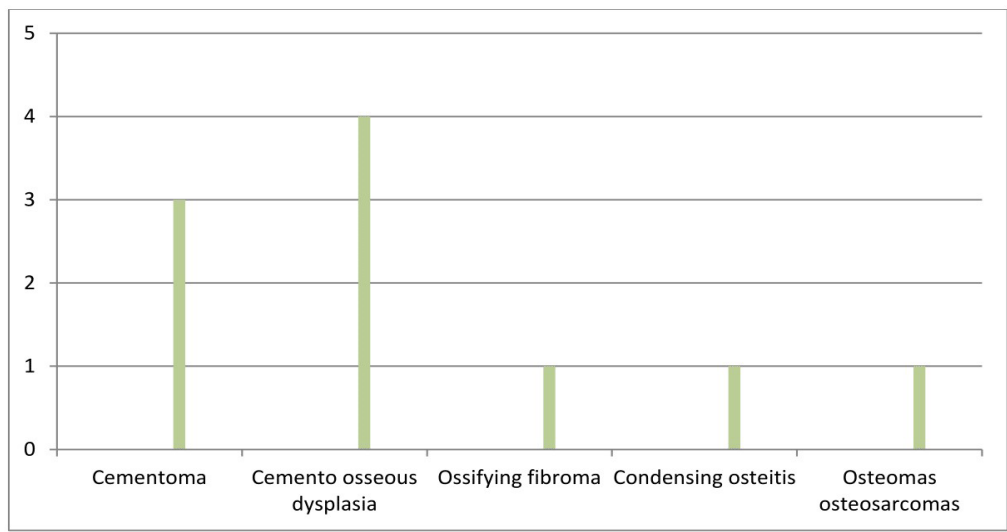




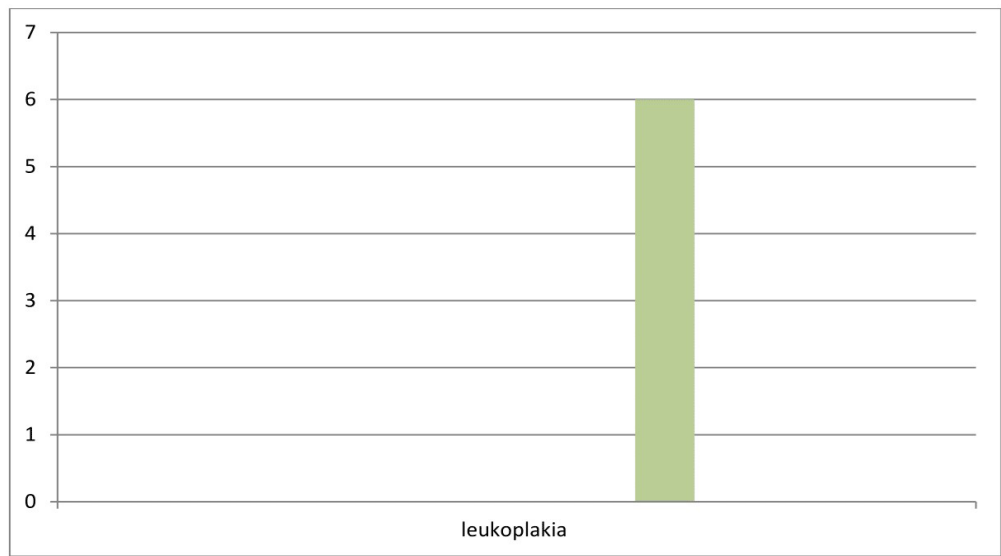
Developmental Disturbances (Hereditary, Acquired, Congenital)



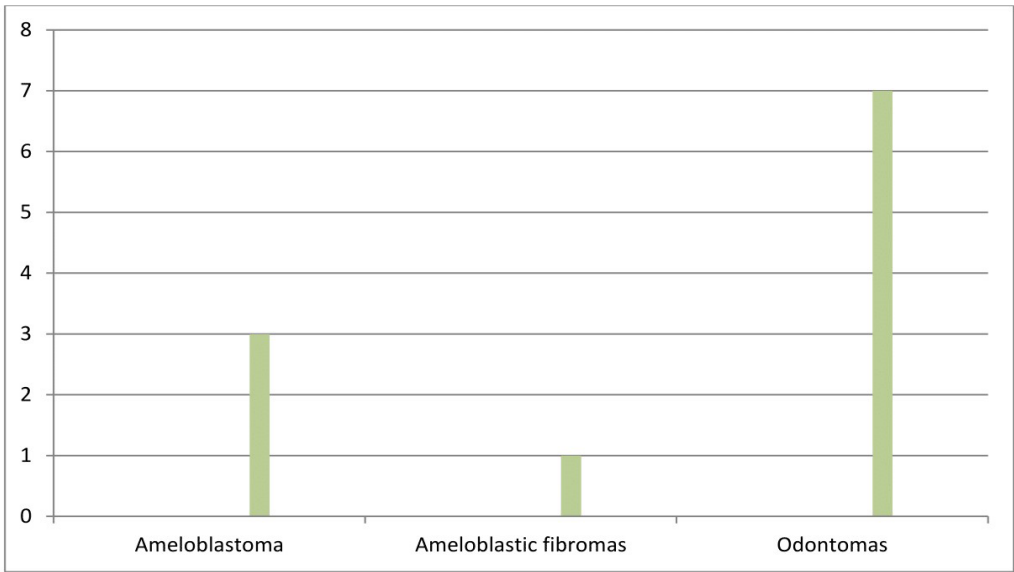
Cystic lesions



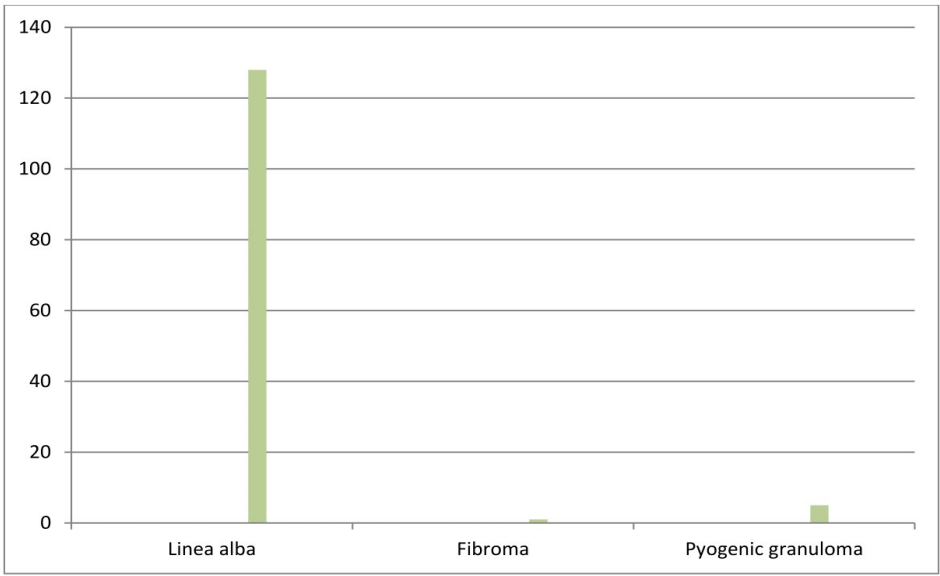
Salivary gland pathology



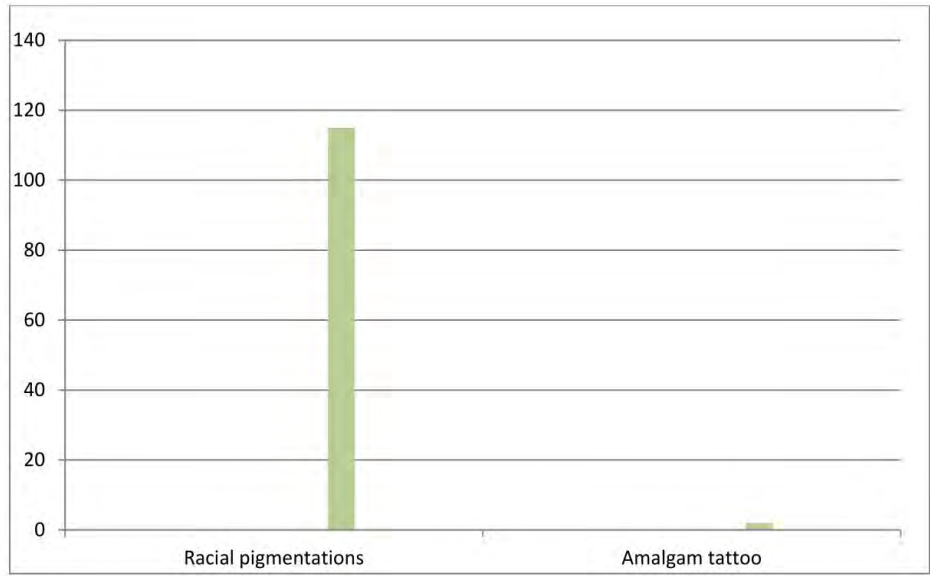
Premalignant Condition



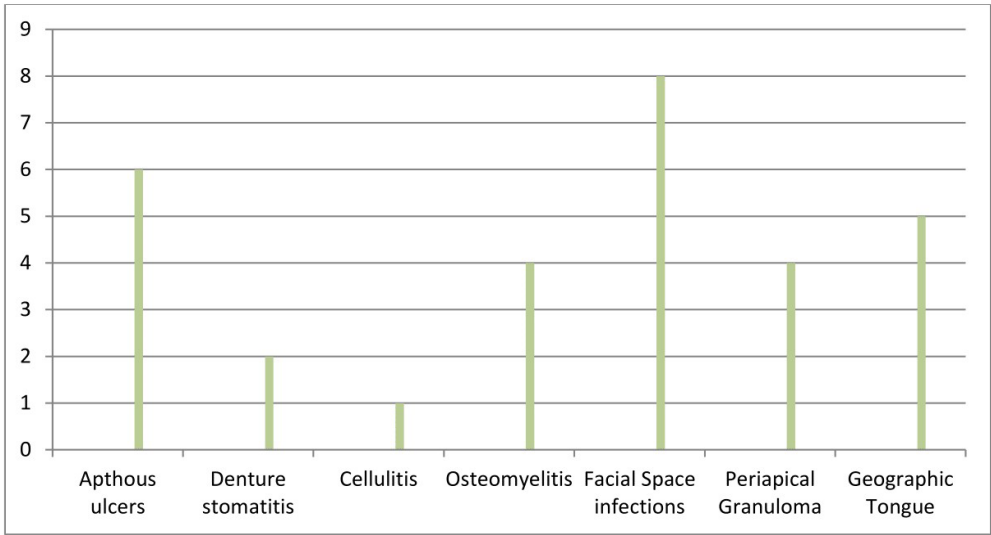
Odontogenic Tumors



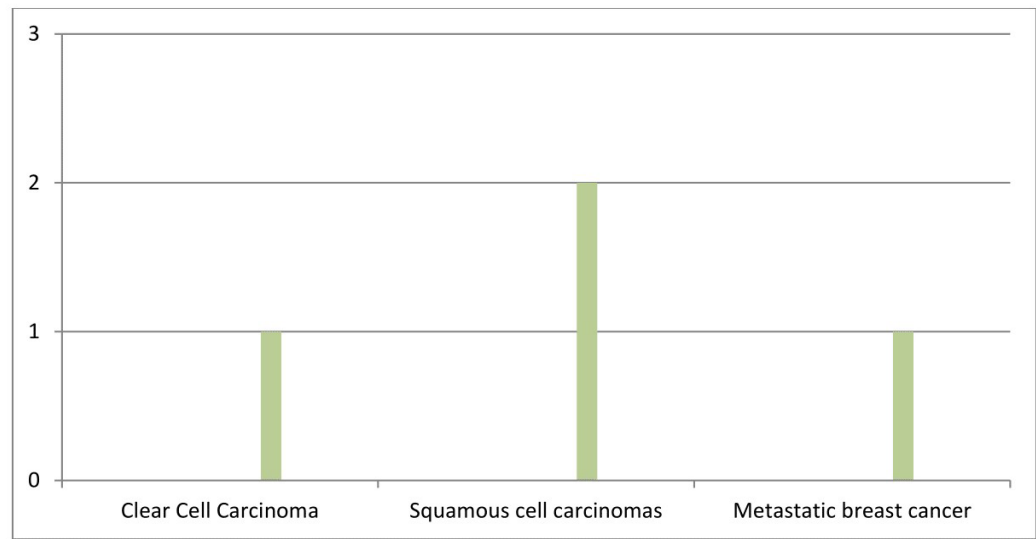
Traumatic or Reactive Lesions



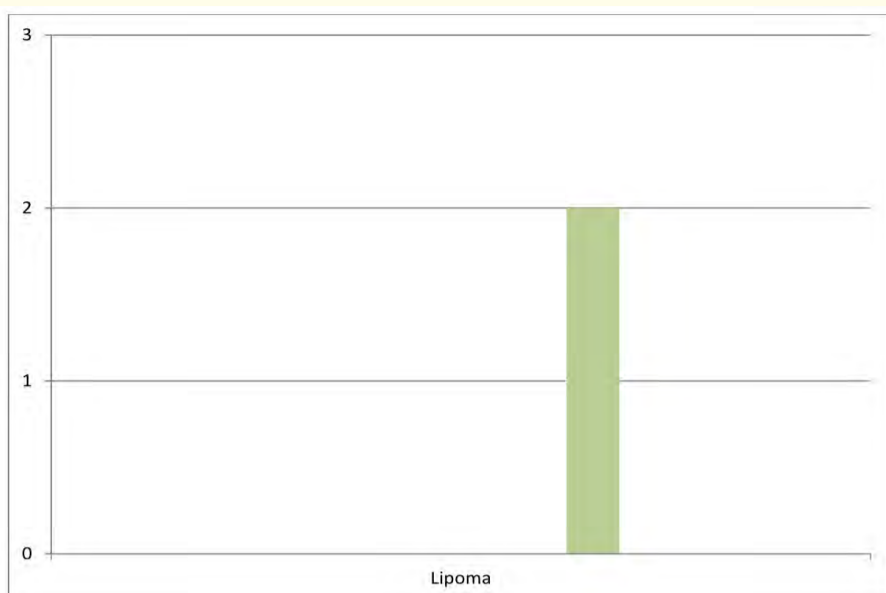
Pigmented Lesions



Infectious and Inflammatory Conditions



Carcinomas



Connective Tissue Lesion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	4	.2	.2	.2
	Normal Tissue	1977	83.5	83.6	83.7
	Leukoplakia	6	.3	.3	84.0
	Fissured Tongue	8	.3	.3	84.3
	Geographic Tongue	5	.2	.2	84.5
	Hairy Tongue	5	.2	.2	84.7
	Mucocele	7	.3	.3	85.0
	MPDS	1	.0	.0	85.1
	Racial Pigmentation	115	4.9	4.9	89.9
	Linea Alba	128	5.4	5.4	95.4
	Ameloblastoma	3	.1	.1	95.5
	Fordyce Granule	3	.1	.1	95.6
	Torus Mandibularis	2	.1	.1	95.7
	Torus Palatinus	5	.2	.2	95.9
	Cleft Palate	3	.1	.1	96.0
	Amalgam Tattoo	2	.1	.1	96.1
	Incisive Canal Cyst	2	.1	.1	96.2
	Odontogenic Keratocyst	4	.2	.2	96.4
	Dentigerous Cyst	4	.2	.2	96.5
	Ossifying Fibroma	1	.0	.0	96.6
	Cementoosseous Dysplasia	4	.2	.2	96.7
	Cementoma	3	.1	.1	96.9
	Periapical Granuloma	4	.2	.2	97.0
	Pyogenic Granuloma	5	.2	.2	97.3
	Radicular Cyst	6	.3	.3	97.5
	Lateral Periodontal Cyst	1	.0	.0	97.5
	Odontoma	7	.3	.3	97.8
	Idiopathic Sclerosis	2	.1	.1	97.9
	Condensing Osteitis	1	.0	.0	98.0
	Denture Stomatitis	2	.1	.1	98.1
	Metastatic Breast Carcinoma	1	.0	.0	98.1
	Ameloblastic Fibroma	1	.0	.0	98.1
Diag					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Solitary Bone Cyst	1	.0	.0	98.2
	Globulomaxillary Cyst	1	.0	.0	98.2
	Osteoma	1	.0	.0	98.3
	Hypercementosis	1	.0	.0	98.3
	Aphthous Ulcer	6	.3	.3	98.6
	Ranula	1	.0	.0	98.6
	Lipoma	2	.1	.1	98.7
	Osteomyelitis	4	.2	.2	98.9
	Coronoid Hyperplasia	5	.2	.2	99.1
	Facial Space Infection	8	.3	.3	99.4
	Pleomorphic Adenoma	3	.1	.1	99.5
	Squamous Cell Carcinoma	2	.1	.1	99.6
	Clear Cell Carcinoma	1	.0	.0	99.7
	TMJ Ankylosis	2	.1	.1	99.7
	Sialadenitis	2	.1	.1	99.8
	Orbital Cellulitis	1	.0	.0	99.9
	Osteosarcoma	1	.0	.0	99.9
	Sialolithiasis	1	.0	.0	100.0
	Sjogrens Syndrome	1	.0	.0	100.0
	Total	2366	100.0	100.0	
Miss- ing	System	1	.0		
	Total	2367	100.0		

Table 1: Frequency distribution of most prevalent oral lesions in all campuses.

Chi-square test was performed to observe any statistical significant difference between prevalence of oral lesions in individual campuses of RCDP and Shamesi hospital. Table 2 shows the result.

diag * Campus Crosstabulation						
			Campus			
			Numetejeyah	Muneseyah	Olaya	Shamesi
diag	0	Count	4	0	0	0
		Expected Count	3.6	.1	.1	.2
Std. Residual		.2	-.3	-.4	-.4	
Normal Tissue	Count	1665	60	72	60	
	Expected Count	1649.4	49.8	68.1	89.7	
	Std. Residual	.4	1.4	.5	-3.1	
Leukoplakia	Count	6	0	0	0	
	Expected Count	5.3	.2	.2	.3	
	Std. Residual	.3	-.4	-.5	-.5	
Fissured Tongue	Count	7	0	1	0	
	Expected Count	7.1	.2	.3	.4	
	Std. Residual	.0	-.5	1.3	-.6	
Geographic Tongue	Count	5	0	0	0	
	Expected Count	4.4	.1	.2	.2	
	Std. Residual	.3	-.4	-.4	-.5	
Hairy Tongue	Count	4	0	1	0	
	Expected Count	4.4	.1	.2	.2	
	Std. Residual	-.2	-.4	1.9	-.5	
Mucocele	Count	6	0	1	0	
	Expected Count	6.2	.2	.3	.3	
	Std. Residual	-.1	-.4	1.5	-.6	
Mpds	Count	1	0	0	0	
	Expected Count	.9	.0	.0	.0	
	Std. Residual	.1	-.2	-.2	-.2	
Racial Pigmentation	Count	109	0	2	0	
	Expected Count	98.6	3.0	4.1	5.4	
	Std. Residual	1.0	-1.7	-1.0	-2.3	
Linea Alba	Count	121	0	3	0	
	Expected Count	110.1	3.3	4.5	6.0	
	Std. Residual	1.0	-1.8	-.7	-2.4	
Ameloblastoma	Count	2	0	0	1	
	Expected Count	2.7	.1	.1	.1	
Diag * Campus Crosstabulation						
			Campus			
			Numetejeyah	Muneseyah	Olaya	Shamesi
diag	Cementoma	Expected Count	2.7	.1	.1	.1
		Std. Residual	.2	-.3	-.3	-.4
Periapical Granuloma	Count	4	0	0	0	
	Expected Count	3.6	.1	.1	.2	
	Std. Residual	.2	-.3	-.4	-.4	
Pyogenic Granuloma	Count	3	0	0	2	
	Expected Count	4.4	.1	.2	.2	
	Std. Residual	-.7	-.4	-.4	3.6	
Radicular Cyst	Count	3	0	0	3	
	Expected Count	5.3	.2	.2	.3	
	Std. Residual	-1.0	-.4	-.5	5.0	
Lat Perio Cyst	Count	1	0	0	0	
	Expected Count	.9	.0	.0	.0	
	Std. Residual	.1	-.2	-.2	-.2	
Odontoma	Count	5	0	0	1	
	Expected Count	5.3	.2	.2	.3	
	Std. Residual	-.1	-.4	-.5	1.3	
Idiopathic Sclerosis	Count	2	0	0	0	
	Expected Count	1.8	.1	.1	.1	
	Std. Residual	.2	-.2	-.3	-.3	
Condensing Osteitis	Count	1	0	0	0	
	Expected Count	.9	.0	.0	.0	
	Std. Residual	.1	-.2	-.2	-.2	
Denture Stomatitis	Count	2	0	0	0	
	Expected Count	1.8	.1	.1	.1	
	Std. Residual	.2	-.2	-.3	-.3	
Metastatic Breast Ca	Count	0	0	0	1	
	Expected Count	.9	.0	.0	.0	
	Std. Residual	-.9	-.2	-.2	4.3	
Ameloblastic Fibroma	Count	1	0	0	0	
	Expected Count	.9	.0	.0	.0	
	Std. Residual	.1	-.2	-.2	-.2	
Diag * Campus Crosstabulation						
			Campus			
			Numetejeyah	Muneseyah	Olaya	Shamesi
diag	Solitary Bone Cyst	Count	1	0	0	0
		Expected Count	.9	.0	.0	.0
Std. Residual		.1	-.2	-.2	-.2	
Globulomax Cyst	Count	1	0	0	0	
	Expected Count	.9	.0	.0	.0	
	Std. Residual	.1	-.2	-.2	-.2	
Osteoma	Count	1	0	0	0	
	Expected Count	.9	.0	.0	.0	
	Std. Residual	.1	-.2	-.2	-.2	
Hypercementosis	Count	1	0	0	0	
	Expected Count	.9	.0	.0	.0	
	Std. Residual	.1	-.2	-.2	-.2	
Aphthous Ulcer	Count	4	0	1	0	
	Expected Count	4.4	.1	.2	.2	
	Std. Residual	-.2	-.4	1.9	-.5	
Ranula	Count	0	0	0	1	
	Expected Count	.9	.0	.0	.0	
	Std. Residual	-.9	-.2	-.2	4.3	
Lipoma	Count	0	0	0	2	
	Expected Count	1.8	.1	.1	.1	
	Std. Residual	-1.3	-.2	-.3	6.1	
Osteomyelitis	Count	0	0	0	4	
	Expected Count	3.6	.1	.1	.2	
	Std. Residual	-1.9	-.3	-.4	8.7	
Coronoid Hyperplasia	Count	0	0	0	5	
	Expected Count	4.4	.1	.2	.2	
	Std. Residual	-2.1	-.4	-.4	9.7	
Facial Space Inf	Count	0	0	0	8	
	Expected Count	7.1	.2	.3	.4	
	Std. Residual	-2.7	-.5	-.5	12.2	
Pleomorphic Adenoma	Count	0	0	0	3	
	Expected Count	2.7	.1	.1	.1	
Diag * Campus Crosstabulation						
			Campus			
			Numetejeyah	Muneseyah	Olaya	Shamesi
diag	Pleomorphic Adenoma	Std. Residual	-1.6	-.3	-.3	7.5
		Count	0	0	0	2
Squamous Cell Ca	Expected Count	1.8	.1	.1	.1	
	Std. Residual	-1.3	-.2	-.3	6.1	
	Count	0	0	0	1	
Clear Cell Ca	Expected Count	.9	.0	.0	.0	
	Std. Residual	-.9	-.2	-.2	4.3	
	Count	0	0	0	2	
Tmj Ankylosis	Expected Count	1.8	.1	.1	.1	
	Std. Residual	-1.3	-.2	-.3	6.1	
	Count	0	0	0	2	
Sialadenitis	Expected Count	1.8	.1	.1	.1	
	Std. Residual	-1.3	-.2	-.3	6.1	
	Count	0	0	0	2	
Orbital Cellulitis	Expected Count	.9	.0	.0	.0	
	Std. Residual	-.9	-.2	-.2	4.3	
	Count	0	0	0	1	
Osteosarcoma	Expected Count	.9	.0	.0	.0	
	Std. Residual	-.9	-.2	-.2	4.3	
	Count	0	0	0	1	
Sialolithiasis	Expected Count	.9	.0	.0	.0	
	Std. Residual	-.9	-.2	-.2	4.3	
	Count	0	0	0	1	
Sjogrens Syndrome	Expected Count	.9	.0	.0	.0	
	Std. Residual	-.9	-.2	-.2	4.3	
	Count	0	0	0	1	
Total	Count	1986	60	82	108	
	Expected Count	1986.0	60.0	82.0	108.0	

Table 2: Frequency distribution of most prevalent oral lesions in individual study sites.

Chi-square test was performed to observe any statistically significant difference between prevalence of oral lesions amongst both the genders. The result is shown in Table 3 and Table 4.

Chi-Square Test result of prevalence of oral lesion in individual study sites			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	899.935 ^a	150	.000
Likelihood Ratio	343.943	150	.000
Linear-by-Linear Association	274.086	1	.000
N of Valid Cases	2236		
Chi-Square Test result of cross tabulation of prevalence of oral lesions amongst both the genders			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	60.473 ^a	50	.147
Likelihood Ratio	72.411	50	.021
Linear-by-Linear Association	1.344	1	.246
N of Valid Cases	2283		

Table 3: Chi-Square Test result.

a. 96 cells (94.1%) have expected count less than 5. The minimum expected count is .42.

			Gender		Total
			Male	Female	
diag	Racial Pigmentation	Count	38	76	114
		Expected Count	48.1	65.9	114.0
		Std. Residual	-1.5	1.2	
	Linea Alba	Count	41	87	128
		Expected Count	54.0	74.0	128.0
		Std. Residual	-1.8	1.5	

Table 4: Gender Crosstabulation of prevalence of racial pigmentation and linea alba.

Discussion

It is clear from this study that amongst a total of 2366 patient only 45 had chief complaint at the time of history taking, while, rest were unaware about any pathological lesion present in oral cavity. Many of these patients would have remained undiagnosed if this would have been a routine dental or periodontal examination. However, it is quite obvious from the results of this study that numerous patients suffered from various oral pathological lesions; some demanding immediate therapeutic intervention such as ameloblastic fibroma (n = 1), ameloblastoma (n = 3), dentigerous cyst (n = 4), odontogenic keratocyst (n = 4), globulomaxillary cyst (n = 1), incisive canal cyst (n = 2), lipoma (n = 2), pleomorphic adenoma (n = 3), squamous cell carcinoma (n = 2), clear cell carcinoma (n = 1), osteomyelitis (n = 4), mucocele (n = 7), ranula (n = 1), coronoid hyperplasia (n = 5), cemento osseous dysplasia (n = 4) and leukoplakia (n = 6).

As shown in Table 2, a total of 1986 patients were examined in Numetejeyah campus, followed by 108 in Shamesi Hospital, 82 in Olaya campus and 60 in Muneseayah campus. Certain lesions such as linea alba (n = 121), racial pigmentation (n = 106), leukoplakia (n = 6), mucocele (n = 6), geographic tongue (n = 5), torus palatinus (n = 5), fordyce granules (n = 3), dentigerous cyst (n = 4) and odontoma (n = 5) were prevalent only in numetejeyah campus, on the other hand, certain tumors and inflammatory conditions such as squamous cell carcinoma (n = 2), clear cell carcinoma (n = 2), osteosarcoma (n = 1), pleomorphic adenoma (n = 3), coronoid hyperplasia (n = 5), facial space infections (n = 8), orbital cellulitis (n = 1), sialadenitis (n = 2) and osteomyelitis (n = 4) were mainly found in shamesi hospital. It is

quite clear that the higher prevalence of tumors and diffuse inflammatory conditions in shamesi hospital is because of it being a tertiary care hospital, nonetheless, developmental conditions such as racial pigmentation, developmental cysts such as dentigerous cyst, odontogenic keratocyst, globulomaxillary cyst and tumors such as odontoma, ameloblastoma and ameloblastic fibroma were prevalent in RCDP as well.

As shown in Table 3, there was no statistically significant difference on the prevalence of oral lesions between both the genders, although, females were more commonly affected with racial pigmentation (n = 76) and linea alba (n = 87) as compared to males (n = 38 and n = 41) respectively (Table 4). The higher prevalence of racial pigmentation in females could be because of females being more esthetically conscious as compared to males, while, higher prevalence of linea alba in females as compared to males could be because of higher prevalence of stress in females as compared to males.

Conclusion

The findings of this study provides information on the type and prevalence of oral lesions among dental patients in various dental centers in Riyadh. Furthermore, this study shows that numerous dental patients who have oral pathological lesions remain undiagnosed or fail to report any symptoms to the dentist, thus, greater emphasizes should be placed on proper oral mucosal and oral hard tissue examination during the routine intraoral examination in dental clinics and dental schools. This study provides baseline data for future studies about the prevalence, etiology and pathogenesis of oral lesions in the Saudi population.

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