Oral Pyogenic Granuloma: Analysis of 137 Cases that presented in a Nigerian Tertiary Health Institution

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ABSTRACT

Background: Oral pyogenic granuloma is a common oral lesion among African population. It often presents as a painless, pedunculated, or sessile mass within the oral cavity. However, etiopathogenesis of oral pyogenic granuloma is still debatable. This article reviewed and identified the possible predisposing factors to the development of oral pyogenic granuloma amongst patients presenting at a sub urban tertiary health care facility.

Methods: Information about 137 patients that presented with pyogenic granuloma from January 2009 to December 2019 were retrieved from the records department of Federal Medical Centre, Nguru. The data that were reviewed and analyzed included ages of patients, gender, anatomical site of lesions, treatment instituted as well as clinical and histopathologic features.

Results: Patients ages ranged from 10 to 70 years (mean=41.02± 2.1 years), with the greatest degree of occurrence (29.19%) in the third decade of life. The male-to-female ratio was 1:1.7. The most frequently involved site was the gingiva. Other sites where pyogenic granuloma was located were the tongue, check mucosa, and palate. Oral pyogenic granulomas were more prevalent in the maxilla than in the mandible, with the labiobuccal gingiva of both jaws more commonly affected. The main complaint of the patients was painless swelling associated with occasional bleeding. More than half of the lesions had a pedunculated base, with surface ulceration in some cases. All lesions were surgically excised, although 8.03% of the cases existed as recurrent lesions.

Conclusion: Although the clinicopathologic features of oral pyogenic granuloma in the study population were similar to those previously reported and their aetiology multifactorial, this study revealed that poor oral hygiene status of patients played a major role in their development.

Keywords: Oral pyogenic granuloma, aetiopathogenesis, poor oral hygiene

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INTRODUCTION

Pyogenic Granuloma has been described as an inflammatory but solitary, and non-neoplastic hyperplastic growth in the tissues of the mouth and on the skin.[1-3] Within the oral cavity, it is commonly located surrounding the anterior and premolar teeth, where it appears mostly on the gingiva.[1,3] Pyogenic granuloma was first considered to be a non-neoplastic growth in nature by Hullihen 1844[4], later on, the term "Pyogenic Granuloma" was introduced by Hartezell in 1904[4-6]. At that time, it was a common disease of the skin and rarely seen in the oral cavity. If found in the mouth, it was usually located on the keratinized tissues.

Though the exact aetiology and pathogenesis of oral pyogenic granuloma is still not well understood, some authors[1,3-4] regard it as a benign neoplastic lesion. They are usually considered as a reactive tumor-like growth in response to various chronic stimuli or a low-grade irritation like plaque and calculus, hormonal changes during pregnancy and traumatic injuries.[1,3-4,7] Certain drugs such as cyclosporine, have also been implicated in their development.[7] Other documented etiological factors for pyogenic granuloma include; primary teeth exfoliation, eruption of adult teeth, gingival inflammation, vascular lesions, defective restoration, food accumulation or foreign body impaction and poor oral hygiene status.[8-10] Although Oral pyogenic granulomas ~~o~~ccur mostly in the gingiva, studies[11-14] have revealed that they could as well be found in the oral mucosa, lips, palate and the tongue. Oral pyogenic granuloma may present as a painless/painful "pedunculated," "sessile," resilient" mass, with more than one lobe or smooth surface that bleed easily.[15] Oral pyogenic granuloma may be found in any age, though it is commonly seen in young females above 20 years, this may be due to the hormonal alterations in this age group.[16] The color of oral pyogenic granuloma may vary from pink to red or purple. The diagnosis of oral pyogenic granuloma is based on clinical, Histopathological and Radiographical examinations.[17-19]

The purpose of this present study was to identify the possible predisposing factors to the development of oral pyogenic granuloma amongst patients presenting at a sub urban tertiary health care facility.

MATERIALS AND METHODS

The medical and dental records of patients who were clinically and histopathologically diagnosed as well as managed for Oral pyogenic granuloma at the oral surgery and preventive Dentistry clinics of Federal Medical Centre, Nguru Yobe State from January 2009 to December 2019 were reviewed retrospectively. Federal medical centre, Nguru, Yobe State Nigeria serves as a reference hospital for neighbouring villages and towns, as well as reference hospital for some parts of Niger republic and hence attends to large volume of patients.

The information extracted from patients' medical records included patients' age, gender, educational background, dental history, oral hygiene status, diagnosis, distribution of oral pyogenic granuloma lesions by anatomic site, signs and symptoms at presentation, and treatment carried out. Oral hygiene status of patients was subjectively classified into good, fair and poor based on the extent of plaque and calculus accumulation. Patients with minimal plaque accumulation with no visible calculus as well as halitosis were regarded as good, while those with mild and moderate to severe calculus accumulation were regarded as fair and poor respectively. Only case records of patients with histopathology report consistent with pyogenic granuloma were retrieved for study.

Patients with predisposing factors and complications arising from the disorder during their hospital visit were also documented. All patients were managed by the researchers and other visiting consultants to the department. Treatment instituted for all the patients was surgical excision of the lesion with the incorporation of 2 mm margins of normal tissue at a depth that will include the periosteum. The surgical excision was carried out in combination with curettage of the underlying tissues to remove the irritant local factors. Patients with co-morbid medical conditions were co-managed with physicians of appropriate specialty.

The extracted data were analyzed using statistical package for social sciences (SPSS) version 15.0 (SPSS Inc, Chicago, IL). Absolute numbers and simple percentages were used to describe categorical variables. Quantitative variables were described using mean (with standard deviation), median and range.

RESULTS

This study involved retrospective evaluation of 137 cases of Oral pyogenic granuloma. There were 51 males and 86 females. The male-to-female ratio was

1:1.7. Patient ages ranged from 10 to 70 years. The mean age of all the patients was 41.02 ± 2.1 years. The ages of the male patients ranged from 15 to 64 years with a mean of 41.01 ± 3.1 while that of the females ranged from 10-70 years with a mean of 41.11 ±1.2. There was no statistically significant difference in the ages of male and female patients (p=0.12).

Among the age groups recorded, the highest frequency was noted between the ages of 30 to 50 years, as well as amongst the educationally deprived individuals (Table 1, fig 1).

We observed that most patients were visiting the dental clinic for the first time. The predominance of female gender was also obvious in the patients managed for pyogenic granuloma. The most common region affected by oral pyogenic granuloma in both genders was the buccal gingiva in about 71.5% of the cases. The Tongue, palate and check mucosa were the other oral sites affected. The site distribution of oral pyogenic granuloma as related to the anatomical sites is demonstrated in (Table 2).

The duration of oral pyogenic granuloma at presentation ranged from 1 to 24 months. All the patients presented with a painless swelling associated with occasional bleeding. Most of them also presented with two or more other symptoms such as bad breath and poor oral hygiene (table 3).

Heavy plaque and calculus deposits especially around the cervical regions of the involved teeth, was a common feature in most of the patients. Fifteen patients were pregnant, two patients had kidney disease, eighteen were diabetic, and other systemic disease were noted as indicated on Table 4. Three patients had a history of cheek biting, seven patients presented with fractured teeth while eight patients presented with retained deciduous teeth. Twelve patients had oral pyogenic granuloma lesions related to the positions of prosthetic teeth (Table 5)

Table 1: Frequency and distribution of oral pyogenic granuloma according to age group.

Variables				Frequency	Percentage
Gender	Total males			51	37.27
	Total females			86	62.73
		X	F	xf	
Age group (years)	10-20	15	8	120	5.84
	21-30	25.5	21	535.5	15.33
	31-40	35.5	40	1420	29.19
	41-50	45.5	35	1592.5	25.55
	51-60	55.5	21	1165.5	15.33
	61-70	65.5	12	786	8.76
			137.	5,619.5	

Mean age= (∑FX/∑F) = (5,619.5/137) =41.018

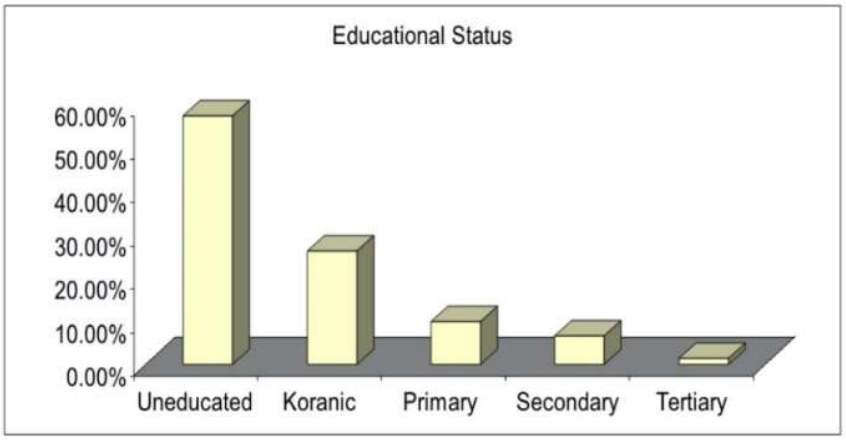


Figure 1: Bar chart showing educational status of patients.

Table 2: Distribution of oral pyogenic granuloma lesions by anatomic site

Site of O*ral pyogenic granuloma.*	Frequency (n)	Percent (%)
Maxillary anterior gingiva (labial)	69	54.76
Maxillary anterior gingival (palatal)	6.	4.76
Maxillary posterior gingiva (buccal)	7	5.56
Maxillary posterior gingival (palatal)	-	-
Mandibular anterior gingiva (labial)	29	23.01
Mandibular anterior gingival (lingual)	-	-
Mandibular posterior gingiva (buccal)	9	7.14
Mandibular posterior gingival (lingual)	7	5.56

Table 3: presenting signs and symptoms oral pyogenic granuloma.

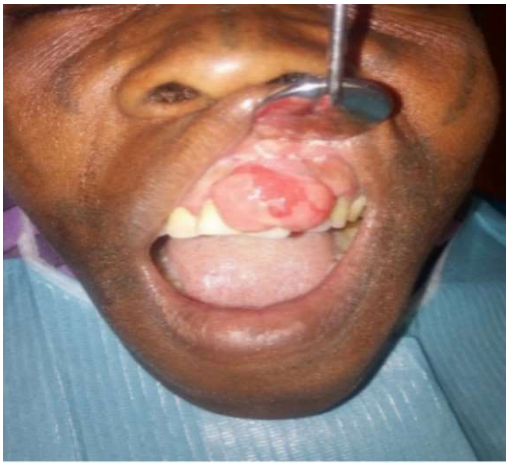
Signs and symptom		Frequency (%)	Percent (%)
Oral hygiene:	Good oral hygiene	2	1.46
	Fair oral hygiene	5	3.65
	Poor oral hygiene	130	94.89
Bleeding		80	58.4
Bad breath		130	94.89
Painless swelling		137	100.00

Table 4: Frequency and distribution of systemic conditions or diseases

Variables		Frequency (%)	Percent (%)
Systemic condition	No systemic condition	91	66.42
	With systemic conditions	46	33.58
Types of systemic diseases			
	Diabetes mellitus	18	13.14
	Peptic ulcer disease	6	4.38
	Hypertension	16	11.38
	Migraine	1	0.73
	Renal diseases	2	1.46
	Rheumatism	3	2.19
	Pregnancy	15	10.95

Table 5: patient's dental history

Variables		Frequency (n)	Percent (%)
Number of dental clinic visit	1st visit	109	79.56
	2nd visit	15	10.95
	3 or more visits	13	9.49
Check biting		3	2.19
Fracture teeth		7	5.11
Retained deciduous teeth		8	5.84
Dental prosthesis		5	3.65



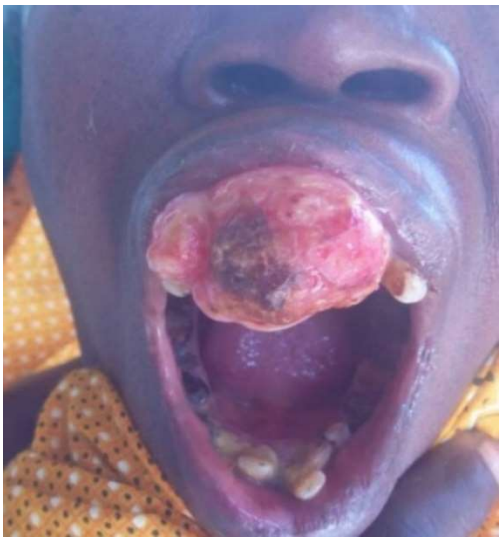


Figure 2: Photograph showing different oral pyogenic granuloma growth on the buccal gingiva of the maxilla at presentation.

The size of pyogenic granuloma in the patients varied in diameter depending on the duration. Excisional biopsy under local anesthesia was the treatment instituted for all the cases. Excised oral pyogenic granuloma lesions were sent for histopathologic analysis.

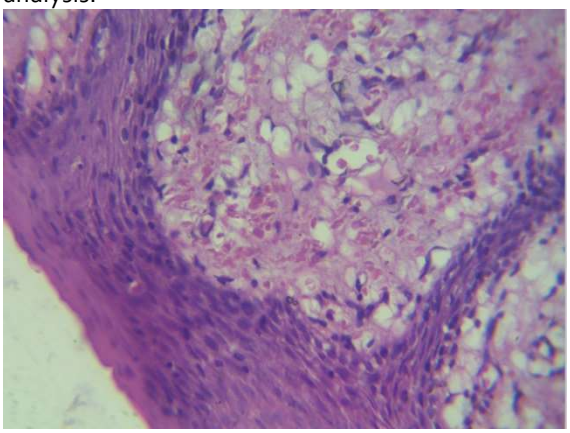


Figure 3: Description: Section showing a hyperplastic keratinizing stratified squamous epithelium overlying a fibrous connective tissue stroma. The fibrous stroma consists of fibroblasts, numerous thin walled vascular spaces and abundant mixed chronic inflammatory cell infiltrates. (H&E x400).

Histomorphological analysis of the majority of oral pyogenic granuloma lesions showed hyperplastic parakeratinized epithelium and underlying cellular stroma, surface epithelium was attenuated and at the margin an epidermal collarette was formed by elongated rete ridge (figure 3). Others revealed a dense chronic inflammatory cell infiltration and fibroblast cells in a highly vascular tissue that resembled granulation tissue. Numerous endothelium-lined vascular spaces were developed and engorged with red blood cells. Upon regular follow-ups (3 months, 6 months, 12 months and 24 months postoperatively), recurrence was observed in eleven patients.

DISCUSSION

Oral pyogenic granuloma has been designated as a common acquired hyper vascularized benign lesion which grows rapidly, frequently presenting as a hemorrhagic red to purple, sessile or pedunculated mass.[1-3,5] Some studies[7,11] revealed that this lesion was common amongst age groups between the fourth and fifth decade of life, while others noted it to occur in all age groups but commoner between 10 to 20 years.[21] Women were more susceptible among the population previously analyzed.[18,20] In this present study, there was a slight difference in age at

presentation. Among the age groups recorded, the lesion was highest between the ages of 30 to 50 years. But in line with previous studies,[1,5,6,21-23] there was a high incidence of oral pyogenic granuloma amongst women of child bearing age. Although the etiology and pathogenesis of oral pyogenic granuloma in this environment is still debatable,[2,3] however, previous studies in other parts of the world have suggested a low-grade but persistent trauma as precipitating factor in approximately one third of patients who had oral pyogenic granuloma[10]. Hormonal changes during pregnancy and certain drugs such as cyclosporine, have also been implicated. Hormonal changes in pregnancy may explain the finding of pyogenic granuloma in pregnant women in the present study. It was said that, the irritation from calculus accumulation may evoke an exaggerated proliferative response of the connective tissue resulting in the angiogenesis and formation of oral pyogenic granuloma.[24-30] In this study, more than 90% of the patients presented with calculus accumulation which resulted from poor oral hygiene and inappropriate dental restorations. Upon regular follow-ups, recurrence was observed in eleven patients. Reasons for these recurrences were not known but it may have been related to inadequacies of clearance margin during surgical excision. If this is the case, these lesions may rather be regarded as residual lesions rather than recurrent lesions. Of these eleven patients, nine had poor oral hygiene with heavy calculus accumulation on the teeth surfaces at presentation. These patients with recurrent lesions were not pregnant, and apparently did not have any other systemic diseases. This may suggest that calculus accumulation from poor oral hygiene may have played a role in the initial development of the oral pyogenic granuloma. This article did not find any correlation between oral pyogenic granuloma formation and any systemic diseases, as majority of the patients had no underlying systemic conditions.

However, we observed that the clinicopathologic features of oral pyogenic granuloma in our study are similar to those of previous studies from other countries.[15, 16] A majority of the patients in our study presented with a painless swelling with or without bleeding.[14,31-32] Age at presentation is an important clinical parameter that should be considered for an accurate diagnosis of this lesion. In the current study, the majority of oral pyogenic granuloma lesions occurred in the third, fourth and fifth decades of life,[6-7] and were noted to be commoner among patient population without basic education. The predominance of oral pyogenic granuloma among females was obvious in this study, which may be due to the vascular effects of sex hormones.[11,14,33-34] In line with previous studies, anterior labial gingiva was the most commonly affected area.[1] Other intraoral regions where pyogenic granuloma was located included buccal mucosa, the tongue and palate.[4] In this study, it was observed that oral pyogenic granuloma occurred in the maxilla more than mandible (figure 2) Similar data were reported in previous studies.[4,5] Although different therapeutic techniques have been suggested, management of oral pyogenic granuloma depends on the severity of symptoms.[6,14]

After surgical excision with 2 mm of normal tissue at a depth that included periosteum, it is recommended to perform curettage of the underlying tissue. This was the treatment for oral pyogenic granuloma in the present study. Other unconventional therapeutic approaches for treatment of oral pyogenic granuloma have been described as alternative therapies and they include cryosurgery or flash lamp pulsed dye laser surgery, sclerotherapy and electrodessication treatment.[1,5,34-36] In the present study, 5.3% of patients were known to have recurred. Recurrence of pyogenic granuloma is rare when there is complete surgical excision with a margin of normal tissue. Recurrence in the present study may be due to incomplete surgical excision, failure to remove predisposing factors, or re-injury of the region.[36] In order to lower recurrence rate, oral pyogenic granuloma lesions must be excised down to the underlying periosteum and the etiologic factors must be removed.[4,35]

CONCLUSION

The clinicopathologic features of oral pyogenic granuloma in the study population, are similar to those previously reported. Although the etiology is believed to be multifactorial, this study revealed that poor oral hygiene status of a patient had a major role to play in the development of oral pyogenic granuloma.

Source of Support
Nil.

Conflict of Interest

None declared

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