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Age, Gender and Site Distribution of Periapical Cysts among Patients treated in a Private Dental Institution - A Prospective Study

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ABSTRACT

Objectives: Periapical cysts have always been a challenging entity where radiodiagnosis is concerned. It is almost impossible to tell a cyst apart from a granuloma. For absolute certainty, invasive procedures like biopsies are still being performed with little to no importance given to demographic clinical manifestations. Thus, this study was conducted in order to assess the pattern of incidence of periapical cysts based on age, gender and site of occurrence in the jaw.

Materials and Methods: This is a prospective study conducted on 75 patients using their images and radiographs of patients who were diagnosed with periapical cysts and were managed surgically in Saveetha Dental College between June 2023 and January 2024. To evaluate the demographic trend, pertinent information about the patient's age, sex, and cyst incidence site was gathered. Statistics was done using the Statistical Package for the Social Sciences for Windows (Version 20.0, SPSS, Inc., Chicago, U.S.A.).

Results: Hereby we can conclude that patients in between the age group of 10-20 years (33.33%) are the most commonly affected accompanied by a male predilection (70.67%). Mandibular posterior tooth region (40%) followed by maxillary anterior region (30.67%) is the most commonly affected site.

Conclusion: Within the constraints of the current investigation, we can infer that males are more likely than females to develop periapical cysts, according to a demographic tendency. The mandibular posterior tooth region and the maxillary anterior region are thought to be at risk for developing periapical cysts in people between the ages of 10 and 20 years.

Keywords: Periapical Cyst; Gender; Age; Site; Bone Lesions; Innovative Technique, Radicular cyst

INTRODUCTION

The most prevalent odontogenic cyst is the periapical cyst, also referred to as a dental cyst. It can develop rapidly from a periapical granuloma due to untreated chronic periapical periodontitis (1). The tissues around the apex of a tooth's root are referred to as the periapical region, whereas a cyst is defined as a pathological cavity walled by epithelium that contains fluid or gaseous contents and is not caused by an accumulation of pus (2). Pulpal necrosis brought on by trauma or dental caries is the cause of dental cysts. Remaining Malassez epithelial cells that proliferate to form the cyst make up its lining. These kinds of cysts are quite common (3). Even though they don't show any symptoms at first, they are nonetheless clinically significant because a recurrent infection can hurt and cause harm. Cysts are diagnosed radiographically as a radiolucency around a tooth's apex (4).

It takes a while for these cysts to form, and if they become secondary infections, they hurt and grow. Initially growing to a hard, spherical protrusion, the cyst eventually leaves behind a softer collection of fluid under the mucous membrane when the body absorbs part of the cyst wall. As secondary indicators of periapical cysts,

inflammation and pulpal necrosis are present. Cysts that are larger may induce bony expansion or root displacement (5). It is also possible that the damaged tooth will become discolored. Electric and thermal tests of the afflicted tooth will be negative, but the patient will be sensitive to percussion. Lymphadenopathy may develop around the gingival tissue (6). When the alveolar plate is palpated, it may show crepitus. As the cyst grows, the maxillary sinus floor becomes more fragile. The rate of expansion increases as it approaches the maxillary antrum because there is greater space for expansion there. Acute pain will be felt during a percussion test, which includes tapping the tooth in question. This is commonly utilized in clinical diagnosis of pulpal infection (7).

True periapical cysts and periapical pocket cysts are the two anatomically different kinds of periapical cysts that can be seen in histopathology (8). The epithelium lining encloses true cysts completely. Surgery, such as a cystectomy, is typically required for the management of this kind of cyst. Epithelium-lined cavities with an opening to the infected tooth's root canal system are known as periapical pocket cysts (9). Following standard root canal therapy, resolution could be achieved. Because they are both radiolucent, it is nearly hard to distinguish between a granuloma and a cyst radiographically. A cyst is more likely to be the cause of a big lesion than a granuloma (10). Particularly with mandibular lesions, many of them resemble cysts. Therefore, a biopsy and tissue evaluation under a microscope are always necessary in order to accurately identify a lesion. Many publications have been published in the last few decades under the guise of distinguishing between granulomas and periapical cysts, but few of them have concentrated on determining the demographic characteristics of the same condition (9-11). Thus, in an effort to identify non-invasive risk factors for the frequency of these lesions, the purpose of our current study was to determine whether gender, age, and site affected the distribution of periapical cysts among a population undergoing dental treatment.

MATERIALS AND METHODS

Study Design and Setting

A prospective study was conducted on patients from June 2023 to January 2024 undergoing various treatments for periapical cyst at Saveetha Dental College, Chennai, India. Ethical approval was obtained from the Institutional Ethics Committee (IHEC/SDC/UG-1801/23/OMFS/338). Scientific Review Board - Saveetha Dental College approved the study (SRB/SDC/UG-1801/23/OMFS/158). The study population consisted of patients with established diagnostic records of periapical cysts who were currently undergoing surgical management for periapical cysts. They were separated according to their gender, age and the site of occurrence.

Inclusion Criteria

75 patients with radiograph and image-documented periapical cysts underwent surgery for the management of the pathology from June 2023 to January 2024 and were included in this study. The patient's age, sex, and the location of the incident were recorded as pertinent information for analyzing the periapical radiographs' demographic profile.

Exclusion Criteria

Patients who were 80 years of age or older or less than 5 were not allowed to participate in the study. People with physical or mental disabilities were excluded because of the possible challenges they might have had when participating. Inconclusive diagnostic findings and repeated patient records were not included in the study.

Radiographic Analysis

In order to primarily confirm the presence of periapical cysts, radiographic analysis was performed on all cases documented for use in the current study at Saveetha Dental College's Radiology Department. They appeared as unilocular, circular or ovoid radiolucencies approximating the apex of the tooth involved, normally measuring 1-1.5 cm in diameter. The borders of the cyst were narrow, opaque margins - contiguous with the lamina dura. A well-defined border of cortication was observed between the surrounding bone and the cyst.

1.1 Statistical Analysis

Statistics was done using the Statistical Package for the Social Sciences for Windows (Version 20.0, SPSS, Inc., Chicago, U.S.A.). Using Pearson's Chi Square test, the significance threshold was established at $p<0.05$.

RESULTS

The final dataset included seventy-five patients, most of them from South India, who had periapical cysts diagnosed and were presently having them surgically corrected. They were grouped according to their gender into ‘Female’ and ‘Male’. They were split into 8 categories based on their age - ‘Less than 10 Years’, ‘10-20 Years’, ‘21-30 Years’, ‘31-40 Years’, ‘41-50 Years’, ‘51-60 Years’, ‘61-70 Years’ and ‘71-80 Years’. Based on the site of occurrence, we considered - the ‘Maxillary Anterior Region’, the ‘Maxillary Posterior Region’, the ‘Mandibular Anterior Region’ and the ‘Mandibular Posterior Region’. With these subsets in mind, they were analyzed for their frequency distributions and statistical implications. Our study results are depicted in Figures 1-6 and Tables 1-3.

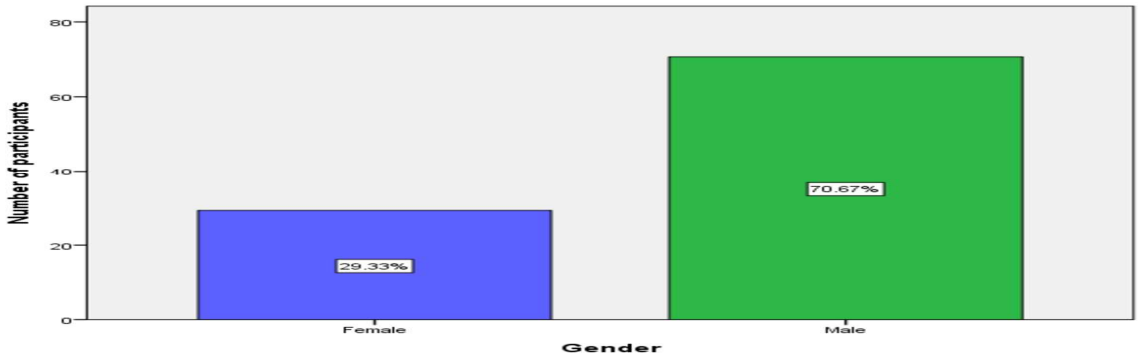

Figure 1. Gender distribution of the study participants

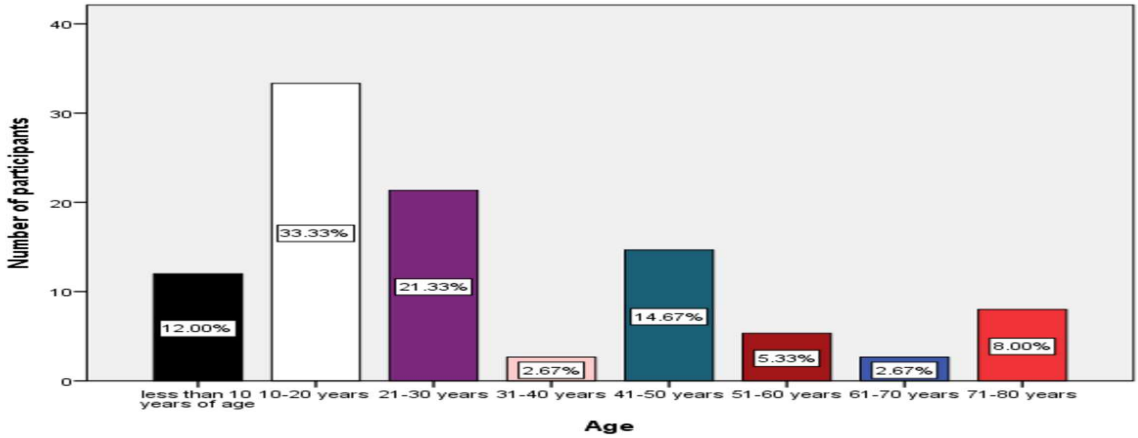

Figure 2. Age distribution of the study participants.

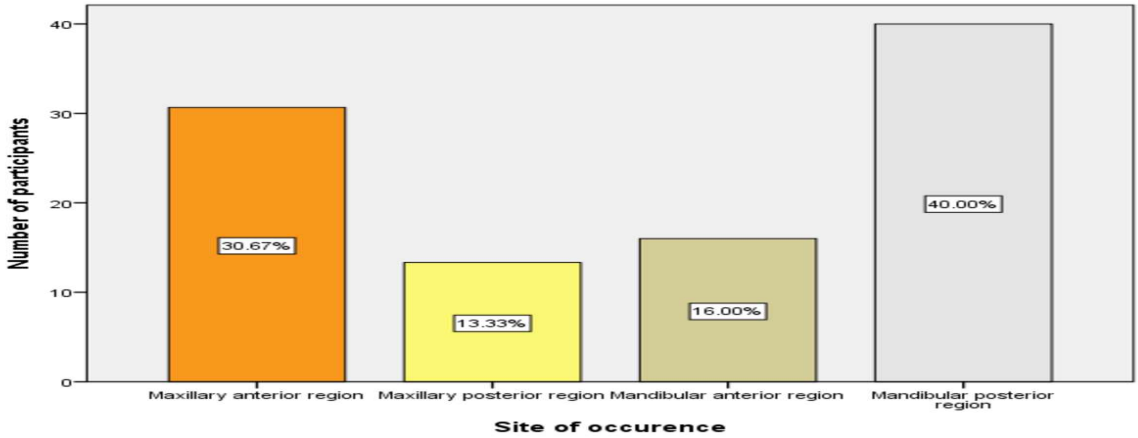

Figure 3. Site of occurrence of periapical cyst among the study participants.

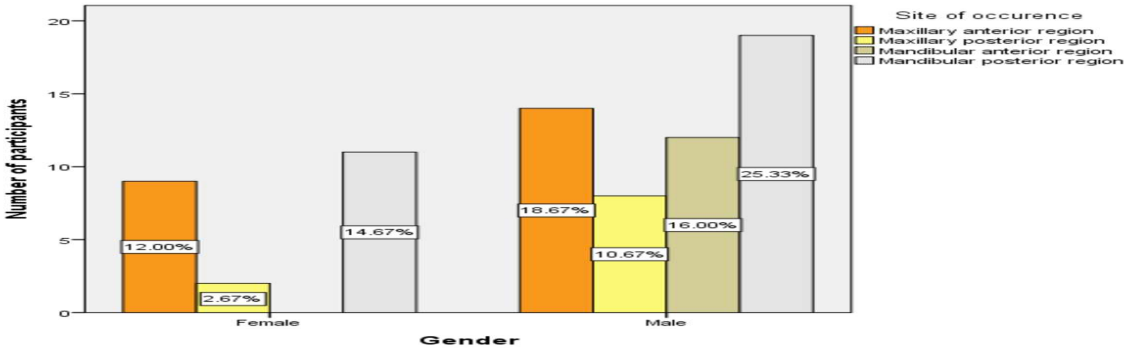

Figure 4. Association between gender and site of occurrence of periapical cyst among the study participants.

Table 1. Association between gender and site of occurrence of periapical cyst among the study participants.

Gender	Maxillary Anterior region	Maxillary posterior region	Mandibular Anterior region	Mandibular posterior region	Total	Chi square test	p value
Male	9	2	0	11	22	7.245	0.064
Female	14	8	12	19	53		
Total	23	10	12	30	75		

Thus, the association between gender and site of occurrence of periapical cyst among the study participants was statistically not significant (p=0.064) with Pearson Chi-Square value=7.245.

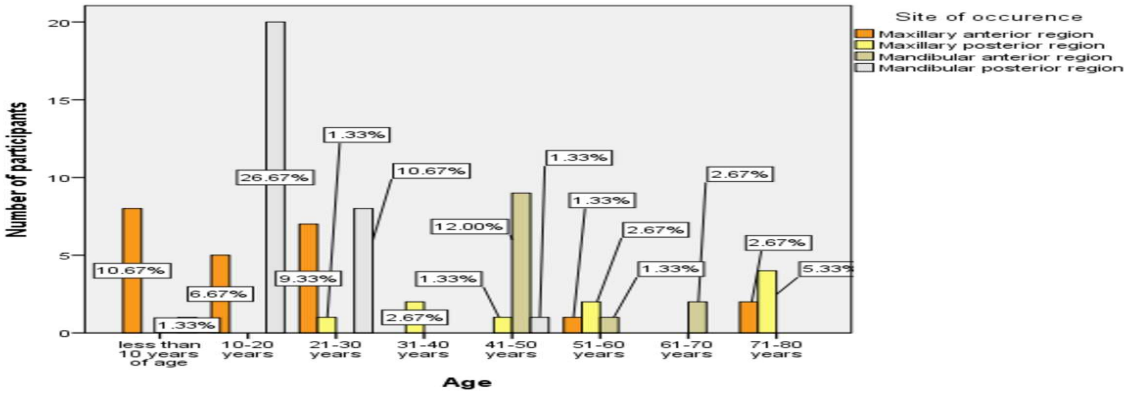

Figure 5. Association between age and site of occurrence of periapical cyst among the study participants.

Table 2. Association between age and site of occurrence of periapical cyst among the study participants.

AGE (years)	Maxillary Anterior region	Maxillary posterior region	Mandibular Anterior region	Mandibular posterior region	Total	Chi square test	p value
Less than 10 years of age	8	0	0	1	9		
10-20 years	5	0	0	29	25		
21-30 years	7	1	0	8	16		

31-40 years	0	2	0	0	2	118.67	0.001
41-50 years	0	1	9	1	11		
51-60 years	1	2	1	0	4		
61-70 years	0	0	2	0	2		
71-80 years	2	4	0	0	6		
Total	23	10	12	30	75		

Thus, the association between age and site of occurrence of periapical cyst among the study participants was statistically significant (p=0.001) with Pearson Chi-Square value=118.67.

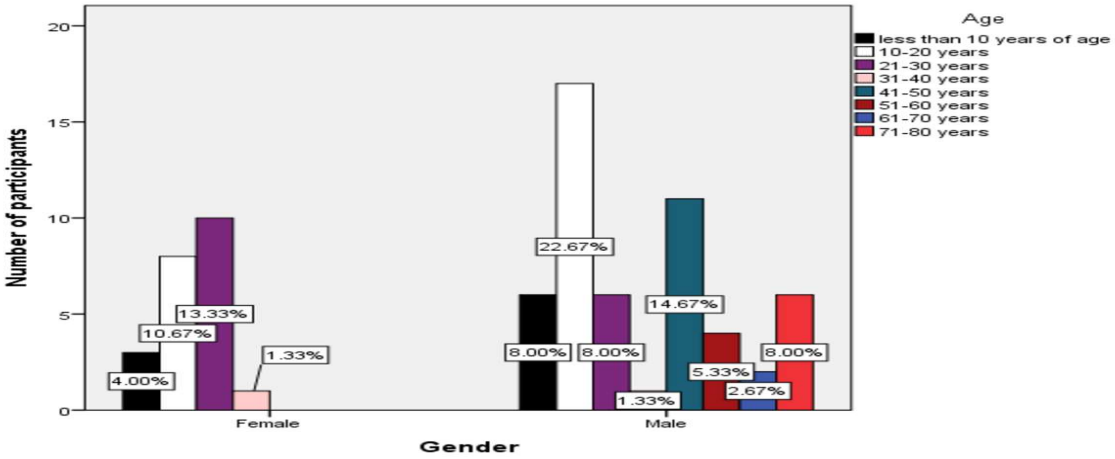

Figure 6. Association between gender and different age groups among the study participants.

Table 3. Association between gender and different age groups among the study participants.

Gender	< 10 years	10-20 years	21-30 years	31-40 years	41-50 years	51-60 years	61-70 years	71-80 years	Total	Chi square test	p value
Male	6	17	6	1	11	4	2	6	53	18.605	0.010
Female	3	8	10	1	0	0	0	0	22		
Total	9	25	16	2	11	4	2	6	75		

Thus, the association between gender and different age groups among the study participants was statistically significant (p=0.010) with Pearson Chi-Square value=18.605.

DISCUSSION

In our study, gender predilection exists in the favor of males (70.67%>29.33%) for the incidence of periapical cysts. There are studies conducted, where they concluded that males had a significantly higher incidence of cysts (58%) when compared to females and also in another study they mentioned that 53.3% of cysts were seen in males and only 46.7% in females (12,13). The distribution of the study participants based on their age shows that the highest incidence of periapical cysts was seen in the age group of '10-20 Years' (33.33%), followed by '21-30 Years' (21.33%), followed by '41-50 Years' (14.67%), followed by 'less than 10 Years' (12%), followed by '71-80 Years' (8%), and '51-60 Years' with 5.33% each, followed by '31-49 Years' and '61-70 years' which was 2.67%. This is synchronization with the findings of a study conducted by another author that said that the peak of prevalence of periapical cysts was seen in the age group of 20-29 Years (14). Another study conducted on a South African population concluded that the highest incidence of cysts was noted in the third decade of life (15). According to our study, the majority of the cyst cases had occurred in the mandibular posterior tooth region (40%). This is inconsistent with the findings of preceding articles where they insist that the most common site of occurrence for periapical cysts is the maxillary anterior tooth region with as high as 30.67% (16). This mismatch may be due to our small sample size, in an unrelated population. Patients of all ages can develop periapical cysts, which peak in the third and fourth decades of life. Such cysts rarely occur in conjunction with deciduous teeth (17). The anterior maxillary area is the most prevalent site for periapical cysts. Cysts linked to deciduous teeth, however, are more frequently found in the mandible. Pain, swelling, discharge, and tenderness are examples of clinical findings (18). On the other hand, a lot of periapical cysts are asymptomatic and unintentionally found during standard radiography testing. Both well-defined and poorly-circumscribed radiolucencies can be seen, and nearby root resorption is a possibility (19). The majority of periapical cysts have a maximum diameter of no more than 2 cm, whereas rare diseases might exhibit spectacular expansion and substantial jaw destruction (19,20).

Association between gender and the site of cyst occurrence was statistically significant with $p< 0.05$, (Chi Square test), where females were more likely to have periapical cysts present in their mandibular posteriors (20%) and males in the maxillary anterior tooth region (30.67%). Although we could not find literature to affirm our findings in the female population, our findings in the male population are consistent with the findings of several other studies where they have all concluded that the maxillary anterior tooth region is extremely susceptible to developing periapical cysts in males (21). Association between age and the site of cyst occurrence revealed that the mandibular posterior tooth region is the most likely to get affected (40%) especially in the age of 10-20 Years. However, these findings were not statistically significant with $p> 0.05$, (Chi Square test). Association between the age and gender of the participants was statistically not significant ($p> 0.05$, Chi Square test), only the male patients were present in age groups higher than 50 years (22,23). All the female patients showed a demographic trend of cyst occurrence below the age of 50 years. Thus, Results of our study reveal that periapical cysts exhibit a male predilection and peak in the third decade of life (21-30 Years). Numerous studies have been done in this particular domain in varied population which have shown the demographic distribution of the periapical (radicular) cysts, and their management with prognosis (24-34).

CONCLUSION

Considering the limitations of our present study we may infer that there is a characteristic demographic trend in the incidence of periapical cysts which may provide clinical insight in terms of playing the role of a risk factor. Male patients between the age group of 21-30 years, the mandibular posterior tooth region and maxillary anterior region seem to exhibit such a susceptibility. So preventive measures should be considered when similar demographics are encountered.

Conflict of Interest

None declared.

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