

# FREQUENCY AND DEMOGRAPHY OF COMMONLY OCCURRING ODONTOGENIC CYSTS IN KHYBER PAKHTUNKHWA (PAKISTAN)

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## ABSTRACT

*The objective of the study was to determine the frequency and demography of commonly occurring Odontogenic cysts in Khyber Pukhtun Khwa (province of Pakistan) population. A descriptive (case series) study was carried out from October 11, 2006 to October 10, 2007 at Department of Oral and Maxillofacial Surgery, Khyber College of Dentistry, Peshawar. The frequency of common Odontogenic cysts was 2.6 %. Majority were found in the age range of 11-20 and 21-30 years with a male to female ratio of 1.7:1. 71.4% Radicular and 64.3% Dentigerous cysts were found in the maxilla while 75 % of Odontogenic Keratocysts were found in the mandible. The most common site of Radicular cysts in maxilla was Canine to Canine, for Dentigerous cysts it was Incisor/Premolar and Odontogenic Keratocysts were mostly seen in Incisor/Premolar/Molar region. The most common location of Radicular cysts in the mandible was Canine to Canine, Dentigerous cysts Molar and Odontogenic Keratocysts Molar/Ramus region.*

*The present study gives sufficient knowledge about frequency and demography of common Odontogenic cysts in Khyber Pukhtun Khwa population.*

**Key words:** *Odontogenic cysts, Radicular cyst, Dentigerous cyst, Keratocyst.*

## INTRODUCTION

The Odontogenic cysts are pathological fluid filled cavities; lined by odontogenic epithelium<sup>1</sup> and the most commonly occurring Odontogenic cysts are Radicular, Dentigerous and Odontogenic Keratocysts.<sup>2</sup> The epidemiological studies on common Odontogenic cysts can help in their timely diagnosis and treatment thus avoiding more surgical trauma, facial and oro-dental deformity and other potential complications.<sup>3,4</sup> The frequency of common Odontogenic cysts as shown by recent two large scale studies in European<sup>5</sup> and UK<sup>6</sup> populations are 13.8% and 12.8% respectively, but no such other studies are available in the literature. The relative frequencies of types of common OCs are documented in the literature but vary in different populations.<sup>7,8,9,10</sup> The frequency and demography (age, gender and site distribution) of common Odontogenic cysts is influenced by race, geographical variations, duration and research methodology.<sup>11,12,13,14</sup>

## METHODOLOGY

The objective of this study was to determine the frequency and demography of common Odontogenic cysts in Khyber Pukhtun Khwa population and to compare with the published reports from other geographic areas of the world. A descriptive (case series) study was carried out from October 11, 2006 to October 10, 2007 at department of Oral and Maxillofacial Surgery Khyber College of Dentistry, Peshawar. A total of hundred consecutive patients having Radicular, Dentigerous and Odontogenic Keratocysts confirmed histopathologically were included in the study. The data was analyzed on SPSS (version 13) soft ware. The frequency and relative frequency was calculated for gender, types and site distribution. For comparisons of types and sites with other studies, Chi Square was used and P<0.05 was taken as significant.

## RESULTS

The frequency of common Odontogenic cysts was 2.6 % (Fig 1) with relative frequencies being as; 70%

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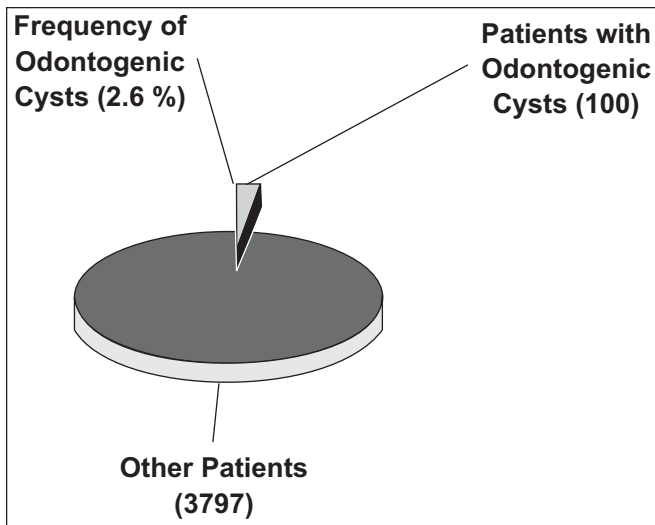


Fig 1: Frequency of common Odontogenic Cysts.

TABLE 1: RELATIVE FREQUENCY OF COMMON ODONTOGENIC CYSTS.

Odontogenic Cyst	Number	Percentage
Radicular Cysts	70	70
Dentigerous Cysts	14	14
Odontogenic Keratocysts	16	16
Total	100	100
Chi Value = 60.560    df=2    Pvalue=.000 (P<0.05)		

Radicular cysts, 14% Dentigerous cysts and 16% Odontogenic Keratocysts (Table 1).

The common Odontogenic cysts were distributed over a wide age range (Fig 2) and the maximums (45%) were in the age range of 11-20 years with a mean age of 25.08 (± SD 11.62) years.

The age range for types of Odontogenic cysts is shown in Table 2. The majority of Radicular cysts (44.3%) were in the age range of 11-20 years, Dentigerous cysts (50%) in the age range of 11-20 years and Odontogenic Keratocysts (43.7% and 37.5%) in the age ranges of 11-20 and 21-30 years respectively.

The male to female ratio for common Odontogenic cysts was 1.7:1 (Fig 3), whereas male to female ratio for types of common Odontogenic cysts was as; Radicular cysts 1.8:1, Dentigerous cysts 1:1 and Odontogenic Keratocysts 2.2:1 (Table 3).

Sixty three percent of common Odontogenic cysts were found in the maxilla and 37% in the mandible (Table 4).

In the maxilla, the most common location for Radicular cysts was Canine to Canine (42.0%),

TABLE 2: AGE RANGE OF TYPES OF COMMON ODONTOGENIC CYSTS.

Age Range	Radicular cysts (n=70)	%age	Dentigerous cysts (n=14)	%age	Odontogenic Keratocysts (n=16)	%age
0-10	2	2.9%	1	7.1%	0	0%
11-20	31	44.3%	7	50.0%	7	43.7%
21-30	22	31.4%	4	28.6%	6	37.5%
31-40	7	10%	0	0%	2	12.5%
41-50	5	7.1%	0	0%	0	0%
51-60	2	2.9%	2	14.3%	1	6.3%
61-70	1	1.4%	0	0%	0	0%
Mean (± SD) age	25.25 (11.88)		24.35 (13.41)		24.93 (9.29)	

TABLE 3: GENDER RELATIONSHIP OF TYPES OF COMMON ODONTOGENIC CYSTS.

Odontogenic cysts	Male	Female	M:F
Radicular cysts	45 (64.3%)	25 (35.7%)	1.8:1
Dentigerous cysts	7 (50.0%)	7 (50.0%)	1:1
Odontogenic Keratocysts	11 (68.8%)	5 (31.3%)	2.2:1
Total	63 (63.0%)	37 (37.0%)	1.7:1

TABLE 4: JAWS DISTRIBUTION OF COMMON ODONTOGENIC CYSTS.

Jaws	Radicular cysts	Dentigerous cysts	Odontogenic Keratocysts	Total
Maxilla	50 (71.4%)	9 (64.3%)	4 (25.0%)	63 (63%)
Mandible	20 (28.6%)	5 (35.7%)	12 (75.0%)	37 (37%)
Total	70 (70%)	14 (14%)	16 (16%)	100 (100%)

TABLE 5: MAXILLARY SITE DISTRIBUTION OF COMMON ODONTOGENIC CYSTS.

Site Distribution	Radicular cysts	Dentigerous cysts	Odontogenic Keratocysts	Total
Canine to canine	21 (42.0%)	0 (0 %)	0 (0 %)	21
Premolar	2 (4.0%)	0 (0 %)	0 (0 %)	2
Molar	6 (12.0%)	1 (11.1%)	0 (0 %)	7
Incisor/Premolar	7 (14.0%)	3 (33.3%)	0 (0 %)	10
Premolar/Molar	9 (18.0%)	1 (11.1%)	0 (0 %)	10
Incisor/Premolar/Molar	4 (8.0%)	3 (33.3%)	2 (50.0%)	9
Premolar/Molar/Sinus	0 (0 %)	1 (11.1%)	1 (25.0%)	2
Incisor/Premolar/Molar/Sinus	1 (2.0%)	0 (0 %)	1 (25.0%)	2
Total	50 (71.4%)	9 (64.3%)	4 (25.0%)	63 (63%)
Chi Value=36.429; df=7; P value=.000(P < 0.05)				

TABLE 6: MANDIBULAR SITE DISTRIBUTION OF COMMON ODONTOGENIC CYSTS.

Site Distribution	Radicular cysts	Dentigerous cysts	Odontogenic Keratocysts	Total
Canine to Canine	9 (45.0%)	0 (0 %)	0 (0 %)	9
Premolar		0 (0 %)	0 (0 %)	
Molar	3 (15%)	2 (40.0%)	1 (8.3%)	6
Premolar/Molar	6 (30%)	1 (20%)	1 (8.3%)	8
Incisor/Premolar	0 (0 %)	0 (0 %)	1 (8.3%)	1
Incisor/Premolar/Molar	1 (5.0%)	0 (0 %)	2 (16.7%)	3
Incisor/Premolar/Molar/ Ramus	1 (5.0%)	0 (0 %)		1
Premolar/Molar/Ramus	0 (0 %)	0 (0 %)	2 (16.7%)	2
Premolar/Molar/ Ramus/Coronoid below Condyle	0 (0 %)	1 (20%)	1 (8.3%)	2
Molar/Ramus	0 (0 %)	0 (0 %)	3 (25.0%)	3
Molar/Ramus/Coronoid below Condyle	0 (0 %)	1 (20%)		1
Ramus/Coronoid	0 (0 %)	0 (0 %)	1 (8.3%)	1
Total	20 (28.6%)	5 (35.7%)	12 (75.0%)	37 (37%)
Chi Value=25.730; df=10; P value=.004(P < 0.05)				

Dentigerous cysts Incisor/Premolar and Incisor/Premolar/Molar (33.3%) and Odontogenic Keratocysts Incisor/Premolar/Molar (50.0%) region. The result was statistically significant (Table 5).

In the mandible the most common location for Radicular cysts was Canine to Canine (45%), Dentigerous cysts Molar (40.0%) and Odontogenic Keratocysts Molar/Ramus (25.0%) region. The result was statistically significant (Table 6).

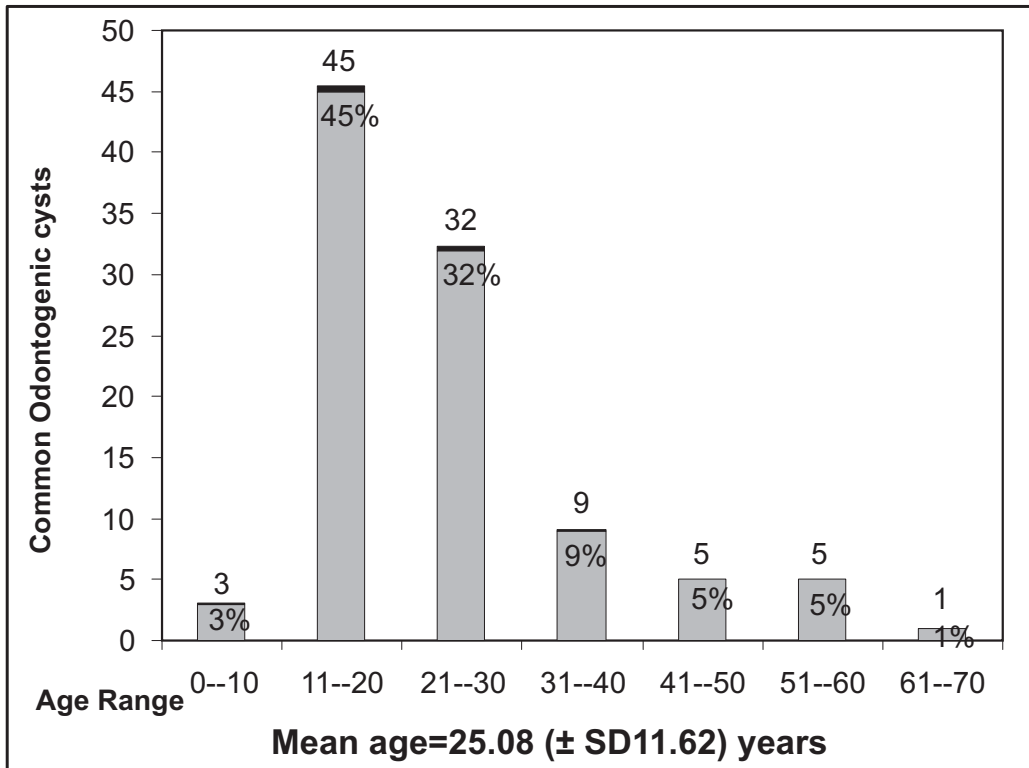


Fig 2: Age Range of common Odontogenic Cysts.

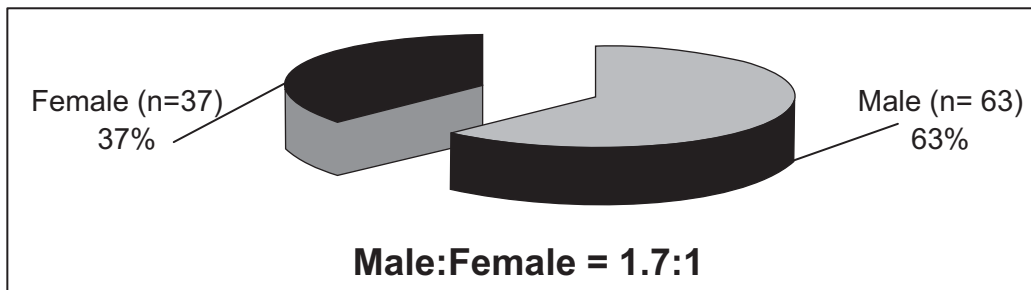


Fig 3: Male to female ratio of common Odontogenic cysts.

**DISCUSSION**

The present study is the first epidemiological study on the frequency and demography of common Odontogenic cysts in Khyber Pukhtun Khwa population. The knowledge on the prevalence of common Odontogenic cysts as well as their commonest sites of presentation, gender and age distribution, all may help to determine a likely clinical diagnosis and thus proper management.

The frequency of common Odontogenic cysts was 2.6 % and is lower than shown in European<sup>5</sup> and UK<sup>6</sup> po-pulations and refers to the time scale of present study. No other studies are available in the literature

dictating upon the frequency of common Odontogenic cysts.

The result for the relative frequencies of common Odontogenic cysts with some variations is consistent with the out come of other studies<sup>6,8,13,14</sup> and refers to the sample size. In the present study the Odontogenic Keratocysts were more frequent than Dentigerous cysts which reflects the geographical or racial difference and is in agreement with the studies in Nigerian<sup>11,12</sup> population where Dentigerous cysts were more common than Radicular cysts and Odontogenic Keratocysts.

The males were slightly more affected than females by common Odontogenic cysts and no other

studies in literature have reflected upon the gender relationship for common Odontogenic cysts. The Radicular cyst affected the males predominantly and differs from the studies in European<sup>5</sup>, UK<sup>6</sup>, and Jordanian<sup>14</sup> populations and reflects the duration of study. The Dentigerous cysts were equally distributed over males and females and differ from other studies in European<sup>5</sup>, UK<sup>6</sup>, Nigerian<sup>12</sup> and Jordanian<sup>14</sup> populations which showed male predominance. This again reflects the racial or geographical difference and the time scale. The Odontogenic Keratocysts were found twice common in males than females and is consistent with the studies in South African<sup>9</sup> and Chile<sup>17</sup> populations but differs from that shown by the most recent and large scale studies in European<sup>5</sup>, UK<sup>6</sup> and Jordanian<sup>14</sup> populations. These differences may be due to time scale and sample size or racial difference.

The peak occurrence of common Odontogenic cysts was in the second, third and fourth decades, whereas in European<sup>6</sup> population it was second and in Jordanian<sup>14</sup> population third and fourth decade. These variations appear to be, due to some geographical difference or research methodology. The mean age for the occurrence of common Odontogenic cysts was 25.08 ( $\pm$  SD 11.62) but no other studies in literature dictates upon the mean age for the occurrence of common Odontogenic cysts.

The peak incidence of Radicular cysts was in the second and third decade and differs from the other studies<sup>8,14,16</sup> but is consistent with the studies in European<sup>5</sup>, UK<sup>6</sup> and Chile<sup>13</sup> population. The mean age for Radicular cysts was 25.25 ( $\pm$  SD 11.88) years and is lower than shown in European<sup>5</sup> and UK<sup>6</sup> populations and reflects the sample size and time scale.

The peak incidence of Dentigerous cysts were noted in second and third decade and is similar to the studies in European<sup>5</sup>, UK<sup>6</sup>, Chile<sup>13</sup>, Jordanian<sup>14</sup> and Mexican<sup>15</sup> populations but differs from the study in Nigerian<sup>12</sup> populations, where Dentigerous cysts were found more common in the third and fourth decade, thus reflecting the geographical and racial differences. The mean age for Dentigerous cysts was found as 24.35 ( $\pm$  SD 13.41) years, with the peak at 13 years and is lower than shown in UK<sup>6</sup> and European<sup>5</sup> population, reflecting the early detection and referral of Dentigerous cysts in this region.

The peak occurrence of Odontogenic Keratocysts was encountered in the second, third and fourth decade and is in agreement with the outcome in Jordanian<sup>14</sup> and Mexican<sup>15</sup> populations while it differs from the outcome in UK<sup>6</sup> population. This may be due to racial difference. The mean age was 24.93 ( $\pm$  SD 9.29) years and is much lower than shown in European<sup>5</sup> and UK<sup>6</sup> populations and again reflecting the early detection and referral in this region.

The common Odontogenic cysts were distributed as 63% in maxilla and 37% in mandible. This is dissimilar to the study in Jordanian<sup>14</sup> population and reflects sample size and duration of study. No other studies reported the distribution of common Odontogenic cysts in the upper and lower jaws. The majority of Radicular cysts (71.4%) were found in the Maxilla and displays to the similar result in UK<sup>6</sup>, South African<sup>8</sup>, Jordanian<sup>14</sup> and Mexican<sup>15</sup> populations and related to the fact that anterior maxillary teeth are particularly more prone to dental caries and trauma. In present study 64.3% Dentigerous cysts involved the maxilla and is dissimilar to the results of studies in UK<sup>6</sup>, South African<sup>8</sup>, and Jordanian<sup>14</sup> populations where mandible was mostly involved. These variations may be referred to either racial difference or study duration. In this study 75 % of Odontogenic Keratocysts involved the mandible and is similar to the studies in UK<sup>6</sup> and Jordanian<sup>14</sup> populations but dissimilar to the findings in Chile<sup>17</sup> population where maxilla was mostly involved and thus reflecting some geographical difference in the jaw presentation for Odontogenic Keratocysts.

The most common location affected by Radicular cysts in the maxilla was canine to canine region (42.0%) and is in agreement with the studies in UK<sup>6</sup> and Jordanian<sup>14</sup> populations. The next common affected site was Premolar/molar region and differs from study in Jordanian population<sup>14</sup> which showed next common site being the molar region but in UK<sup>6</sup> population next common affected sites were premolar and molar region respectively. These differences in the sites of occurrence of Radicular cysts in the maxilla are due to the various different combination sites of involvement searched in this study and are not reported in the literature before.

The most common sites involved by Dentigerous cysts in maxilla were Incisor/Premolar and Incisor/Premolar/Molar (33.3%) regions and is in agreement

with the studies in UK<sup>6</sup>, South African<sup>8</sup> and Jordanian<sup>14</sup> populations.

The most common site of occurrence of Odontogenic Keratocysts in the maxilla was Incisor/Premolar/Molar (50.0%) with the next commonest sites being the Premolar/Molar/Sinus and Incisor/Premolar/Molar/Sinus regions and is consistent with the outcome in Jordanian population<sup>14</sup>

The most common locations involved by Radicular cysts in the mandible were canine to canine (45.0%) and Premolar/molar (30.0%) regions. This is dissimilar to the outcome of studies in UK<sup>6</sup> and South African<sup>8</sup> populations where more common site was mandibular posterior molar region but is similar to the findings in Jordanian<sup>14</sup> populations. The most common sites involved by Dentigerous cysts were Molar (40.0%) and Premolar/Molar/Ramus/Coronoid below condyle (20.0%) regions. The results are consistent with the studies in UK<sup>6</sup>, South African<sup>8</sup>, Nigerian<sup>12</sup>, and Jordanian<sup>14</sup> populations. The most common site involved by Odontogenic Keratocysts was Molar/Ramus (25.0%) region and is in agreement with the studies in UK<sup>6</sup> and Jordanian<sup>14</sup> populations.

The results for the types and site presentation of common Odontogenic cysts when compared with other studies were statistically significant (P<0.05).

**CONCLUSION**

The present study though of small sample and short duration is unique in the sense; that it is the first epidemiological study on common Odontogenic cysts in Khyber Pukhtun Khwa population and is comparable with recent large scale international studies. This also reveals that there are some geographical or racial difference in the relative frequency and the site presentation of common Odontogenic cysts.

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