

Original Article

Oral pediatric pathologies: Incidence and demography – An institutional study in Delhi, India

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ABSTRACT

Objective: Development and growth is at its most dynamic phase before adolescence. The increased awareness of early diagnosis having a better prognosis has led to the identification of many oral pathologies in a pediatric population. While many profiles of oral biopsies from children are available, the role of regional and geographic variations could be ascertained through periodic evaluation and data collection. The main aim of this retrospective study was to assess the distribution, frequency, and type of pediatric cases that are seen in a dental setting catering to predominantly lower socioeconomic strata of population in a region of Delhi, India.

Materials and Methods: Archives of biopsies submitted to the department of oral and maxillofacial pathology were taken from the year 2012 to 2018 and all cases under the age of 13 or below were included in the study. A total of 851 archived cases were retrieved, of which 60 fulfilled our criteria for case selection. The available data were categorized into seven groups according to (1) age (0–4, 5–8, and 9–13 years), (2) sex, (3) site (area affected and intra-/extraosseous), (4) inflammatory/reactive, (5) cystic (odontogenic {inflammatory/developmental}/non-odontogenic), (6) neoplastic ([a] odontogenic/non-odontogenic and [b] benign/malignant), and (7) others (infections).

Results: The analysis showed that most of the lesions were within the 9–13 years age group (61.66%) with male gender predominance, M:F ratio being 1.6:1. The lesions were mostly extraosseous ($n = 34$) with mandible being commonly afflicted (36.6%). Among the pathologic cases, the lesions were mostly non-odontogenic with the mucocele appearing as the most common reactive lesion. The incidence of radicular cyst ($n = 5$) was found to be higher among the odontogenic cystic lesions ($n = 12$). One (rhabdomyosarcoma) out of 10 neoplastic lesions was malignant Benign:Malignant ratio (9:1). While ameloblastoma was seen as the common benign odontogenic tumor, the ossifying fibroma was predominant among the non-odontogenic group. Tuberculosis followed by osteomyelitis was seen to be prevalent under the category of infections.

Conclusion: This study helps us to observe the common lesions or conditions afflicting children in this part of India and their association with age, sex, and site. It was found that a higher incidence of reactive lesion is present in this age group, while the neoplastic lesions are predominantly benign similar to other studies.

Keywords: Pediatric pathologies, Head and neck, Biopsies, Oral diagnosis, Incidence

INTRODUCTION

India has one of the largest pediatric populations in the world with almost 20.43 million children in the age group of 0–13 years as per the 2018 statistics provided by the Ministry of Statistics and Program Implementation – Government of India.^[1] The most important initial developmental phase of growth is the period before adolescence. The chance of identifying pathologies during this period of dynamic growth has increased with awareness among parents about dental health

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and early diagnosis. The experience of the oral pathologists thus becomes critical and valuable in diagnosing pathologies encountered in this age group. However, epidemiological studies on the incidence and prevalence of pediatric pathologies are far and few with many data pertaining to any one particular pathological entity.^[2,3] While studies on pediatric jaw tumors in India have been reported (Saxena *et al.*),^[4] very few studies oral pediatric pathologies have been done in the Indian subcontinent.^[5] This retrospective study tries to assess the distribution, frequency, and type of pediatric cases that are seen in a dental setting catering to predominantly lower socioeconomic strata of population in a part of Delhi, India. This study further tries to emphasize the role of regional and geographic variations through periodic evaluation and data collection which would enable the establishment of childhood pathology registry in the country.

MATERIALS AND METHODS

Archives of biopsies submitted to the department of oral and maxillofacial pathology were taken from the year 2012 to 2018 and all cases under the age of 13 or below were included (as per the Dental Council of India [DCI] general body decision in 2017). A total of 851 archived cases were retrieved, of which 60 fulfilled our criteria for case selection. The available data were stratified into seven groups according to age (Group 1), sex (Group 2), site (Group 3), inflammatory/reactive (Group 4), cystic (Group 5), neoplastic (Group 6), and others (infections) (Group 7). Categories were made within the age group to assess lesional distribution based on the developmental stage to represent children as infants (0–4 years), child (5–8 years), and pre-adolescent (9–13 years), respectively. The area of affliction along with whether it was an intraosseous or extraosseous lesion was taken into account for site anatomy. Under the cystic group, the lesions were analyzed based on whether they are odontogenic (inflammatory/developmental)/non-odontogenic. The neoplastic lesions were further classified under odontogenic benign/malignant and non-odontogenic benign and malignant. All other lesions such as infections and torus were grouped under others.

Inclusion criteria

The following criteria were included in the study:

1. All biopsies of patients aged 13 and below
2. Inclusion of both soft and hard tissue pathologies.

Exclusion criteria

1. All cases of dental caries, impaction, pulpitis, pericoronitis, and supernumerary teeth were excluded
2. Incomplete data with respect to age, gender, or histopathological diagnosis were excluded

3. Multiple specimens from one patient were treated as one lesional tissue specimen.

RESULTS

Out of the 851 archived biopsy specimens, 60 tissue biopsies fit our criteria of pediatric pathologies were taken as the study sample. The analysis showed a male gender predominance M:F ratio being 1.6:1 with most of the lesions lying within the 9–13 years age group (61.66%). Site distribution analysis revealed that out of all the lesional sites, 15 were found in the mandible (31.25%) and 14 in the maxilla (29.1%) followed by 9 (4.32%) in lip [Table 1]. The cases were mostly non-odontogenic with the mucous extravasation cyst appearing as the most common reactive lesion. One out of 10 neoplastic lesions was malignant. About 15% of the lesions fell into the others category and were mostly infectious in nature. Non-specific inflammation, reactive lymphadenopathy, and a case of torus were categorized as miscellaneous [Table 2].

DISCUSSION

The frequency of diseases pertaining to the pediatric population from biopsies worldwide lies in an average of 5.2–12.8%.^[6] With about 60 pediatric biopsies out of the total 851, 7.05% was observed in the present study which falls well within the range observed in literature.^[7,8] Some authors have found the incidence to be more, estimating an average range of 5.5%–24.8%.^[5,9] All these, however, clearly indicate that the overall pathologic burden in the pediatric age group is less than that of the adult group. The variations found within these studies are influenced by the changes in the geography and the criteria that have been included or excluded within the study sample, chief among them being the determination of the pediatric age limit. We have taken 13 years as the upper

Table 1: Distribution of anatomical location (site/intraosseous/extraosseous involvement) with percentage of site predilection and sex incidence.

| I Site | Male | Female | Total number of cases | Percentage (w.r.t site predilection) |
|-------------------------------|------|--------|-----------------------|--------------------------------------|
| Maxilla | 4 | 3 | 7 | 11.6 |
| Mandible | 17 | 5 | 22 | 36.6 |
| Lip | 7 | 5 | 12 | 20 |
| Tongue | 2 | 3 | 5 | 8.3 |
| Palate | 3 | 1 | 4 | 6.6 |
| Face/cheek | 2 | 4 | 6 | 10 |
| Gingiva | 2 | 2 | 4 | 6.6 |
| Total | 37 | 23 | 60 | |
| II Intra-/extraosseous | | | | |
| Extraosseous | 18 | 16 | 34 | 56.7 |
| Intraosseous | 19 | 07 | 26 | 43.3 |

age limit for a pediatric patient based on the DCI general body decision in 2017 (DE-130-M2-2017). Among our pediatric patients, predominant number of pathoses is seen to occur in the preadolescent age group of 9–13 years and has been corroborated by other studies across the globe.^[6,7,10] The reason behind this higher frequency could be due to the body's rapid development at this time. This creates a positive environment that affects the growth potential of neoplasms if any and the already intense odontogenic activity could lead to an increased number of lesions.^[2] Sex predilection for oral pediatric lesions has been equal in some^[7,8,11] while females tend to have more affliction in some.^[5,6] Our study shows a predominantly male predilection with a male-to-female ratio of 1.6:1 [Table 3] similar to Vale *et al.* and Skiavounou *et al.*^[9,12] Analyzing the site distribution, a predilection for mandible followed by maxilla and lip was found similar to the study by Krishnan *et al.*^[5] This is in contrast to few studies where maxilla was most afflicted [Table 1].^[8,13] The encountered pediatric lesions were mostly non-odontogenic with the majority falling into the group of inflammatory/reactive lesions (46.7%) [Table 2]. The mucocele was the

most common lesion here and showed predilection for lower lip and female sex^[5,8,14,15] followed by fibroepithelial hyperplasia and pyogenic granuloma. Mucoceles were mostly of the extravasation type and were seen to be more in the 9–13 years of age group. Trauma due to prevalent lip biting habits in children of this age could be attributed to its prevalence.^[15] Under the cystic lesions category, 21.7% of all our biopsied oral lesions were cystic [Table 2], very similar to Wang *et al.* (22.1%) and Silva *et al.* (21.3%). While the normal range was initially accounted to be 7–13%,^[16] an incidence of up to 35% has been seen.^[10,15] Inflammatory cysts (radicular cyst) were the most common followed by dentigerous cyst and odontogenic keratocyst. This finding is in accordance with Padmakumar *et al.* and Keszler *et al.* and can attest to the fact that socioeconomic conditions and dental health of the patient play a role.^[7,17] Developmental cysts seem to be more common^[10,15] among the odontogenic cystic lesions in some studies. The reason behind this could be an under-reporting of inflammatory cysts as a result of spontaneous resolution due to exfoliation of primary teeth. The usual occurrence of odontogenic keratocyst in the second decade

Table 2: Distribution of all biopsied lesions based on histopathological diagnosis and gender predilection.

| Pathologic lesions | Male | Female | Total number of cases | Percentage |
|----------------------------------|------|--------|-----------------------|------------|
| (i) Inflammatory/reactive lesion | | | 28 | 46.7 |
| Mucocele | 5 | 9 | 14 | |
| Pyogenic granuloma | 1 | 1 | 2 | |
| Fibro epithelial hyperplasia | 7 | 2 | 9 | |
| Periapical granuloma | 2 | 0 | 2 | |
| Fibromatosis gingivae | 0 | 1 | 1 | |
| (ii) Cystic odontogenic | | | 13 | 21.7 |
| Periapical cyst | 3 | 1 | 4 | |
| Odontogenic keratocyst | 2 | 1 | 3 | |
| Dentigerous cyst | 4 | 1 | 5 | |
| Inflammatory periodontal cyst | | 1 | 1 | |
| (iii) Neoplastic | | | 5 | 8.3 |
| (a)-Odontogenic (benign) | | | | |
| Ameloblastoma (follicular) | 4 | 1 | 5 | |
| (iv) Neoplastic | | | 4 | 6.7 |
| (b)-Non-odontogenic (benign) | | | | |
| Ossifying fibroma | 1 | 1 | 2 | |
| Fibroma | 1 | | 1 | |
| Hemangioma | 1 | 0 | 1 | |
| (c)-Non-odontogenic (malign.) | | | 1 | 1.6 |
| Malignant round cell tumor | | | 1 | |
| (v) Others | | | 6 | 10 |
| Infections | | | | |
| Tuberculosis | 3 | 0 | 3 | |
| Cysticercosis cellulose | | | 1 | |
| Osteomyelitis | 0 | 2 | 2 | |
| Miscellaneous | | | 3 | 5 |
| Non-specific inflammation | 1 | 0 | | |
| Reactive lymphadenopathy | 1 | 0 | | |
| Torus | 1 | 0 | | |

Table 3: Pediatric case distribution (according to age with sex incidence and ratio).

| Age distribution | Male (n) | Female (n) | Number of cases | M:F |
|------------------|----------|------------|-----------------|--------|
| 0–4 years | 3 | 4 | 07 | 0.8:1 |
| 5–8 years | 9 | 7 | 16 | 1.3:1 |
| 9–13 years | 25 | 12 | 37 | 2.08:1 |
| Total | 37 | 23 | 60 | 1.6:1 |

with involvement of maxilla frequently held true in our study and was seen affecting both the sexes with equal frequency similar to the study by Urs *et al.*^[18]

All the neoplastic lesions in our study were benign with only one turning out to be malignant out of the 60 cases (1.6%). This was diagnosed in an 11-year-old female patient as a malignant round cell tumor (rhabdomyosarcoma). The incidence of head-and-neck malignancies in a pediatric population though low comprises almost 12% of all childhood malignancies.^[19] Rhabdomyosarcoma is among the most common soft tissue sarcomas (STS) with an increased incidence in the head-and-neck region in children with an incidence of 50% in the first decade.^[20] Early identification of STS would lead to a better prognosis in affected children. In the benign, neoplastic odontogenic group, ameloblastoma of the follicular type was found to be the most common benign odontogenic tumor [8.3%].^[4,5,10] All of them occurred in the 9–13 years of age group. The cases showed a predilection for males and posterior region of mandible. While four were intraosseous, one was extraosseous seen over the posterior alveolar crest region. The occurrence of such peripheral ameloblastoma is usually seen in the 2nd–8th decades of life.^[21] Our patient was 6 years old indicating occurrence even in the pediatric age group and emphasizes the need for careful identification and evaluation. Ossifying fibroma followed by one case of fibroma and hemangioma each was seen to be the lesions most prevalent under non-odontogenic benign neoplasms in the present study. Tuberculosis and osteomyelitis and one case of cysticercosis were seen under infectious diseases. Tuberculosis though controlled through a vigorous directly observed treatment short-course regimen still is considered to be quite prevalent in India with socioeconomic conditions influencing its incidence.

CONCLUSION

The knowledge of the various pediatric pathologies in each area is of paramount importance to assess the incidence and stratifications of the condition in its presentation with respect to different geographies. This would help clinicians all over the world to share data and devise methods that would lead to early diagnosis and prevention of mortality through better prognosis. The different pathoses found in our

region seemed to be consistent with the existing literature on pediatric head-and-neck lesions. The authors hope that this kind of sequential data compilation would pave way for an exhaustive compilation of all pediatric head-and-neck pathologies in this country.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

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