

Common x-ray findings for Paranasal Sinuses and Postnasal Space in two hospitals in Sokoto Metropolis

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Abstract

Background: This is a retrospective study to determine the common radiographic findings in paranasal sinuses and postnasal space and to determine age and gender distributions of the findings.

Objectives: to determine the common radiographic findings in paranasal sinuses and postnasal space and to determine age and gender distributions of the findings.

Methods: A retrospective descriptive study was conducted on 195 radiological reports of patients that underwent paranasal sinuses and postnasal space radiographic examination. Data capture sheet was categorized based on findings of Paranasal space radiography. Various age groups were recorded and statistical inferences were drawn from the data obtained.

Results: Rhinitis was the most common radiographic finding in paranasal sinuses (45; 48.91%) followed by rhinosinusitis 34(33.02%) with patients among the age group of 24-33 mostly affected. Adenoid hypertrophy 71(78.26%) was the most common radiographic finding in postnasal space with 0-2 age group having the highest frequency.

Conclusion: Plain radiography is a valuable diagnostic tool for the evaluation of paranasal sinuses and postnasal space. Sinusitis is the most common radiographic finding in paranasal sinuses and adenoid hypertrophy is the most common in postnasal space.

Keywords: Radiograph, paranasal sinuses, postnasal space, Adenoid, Rhinitis.

Introduction

Paranasal sinuses lesions are common and affect wide range of population ranging from inflammatory to neoplastic with the inflammatory diseases being the most common [1,2]. Plain x-ray (radiography) serve as a diagnostic tool used to diagnose the diseases affecting the paranasal sinuses [3]. Plain radiographs depict pathologies associated with mucosal thickening, presence of air-fluid level and partial or complete opacification of the affected sinuses. Plain radiographs have a high percentage of false negative (<20) and false positive (<25%) results compared to computed tomography (CT) of paranasal sinuses [4]. Plain radiography has a limited role in the diagnosis of paranasal sinuses diseases [4]. Antero-posterior, lateral and 45° occipito-mental (Water's) projections are the basic radiographic views for paranasal sinuses. However, paranasal sinuses 45° occipito-mental projection is the most important of all the

projections [5]. This is due to the fact that, it demonstrates all the sinuses. Postnasal space (nasopharynx) is prone to many pathological conditions ranging from embryologic abnormalities to neoplastic lesions [6]. Plain radiograph is used for the assessment of adenoids in children although it has less sensitivity. Nasoendoscopy has more sensitivity than the plain radiograph in assessing the size of the adenoids [7]. Although, hypertrophic adenoidal mass is the most common radiographic finding in paediatrics' postnasal radiographs, malignant lesions may be seen in nasopharyngeal area but in rare cases. These malignant lesions are commonly sarcomas and lymphomas in younger children and carcinomas in teenagers and adolescents⁸. Computed tomography (CT) and magnetic resonance imaging (MRI) are used to further evaluate the paranasal sinuses and nasopharyngeal lesions. Computed tomography is considered as a goal standard imaging modality for evaluating paranasal sinuses because; it provides

information about the distribution and extent of paranasal sinuses diseases [9]. Magnetic resonance imaging (MRI) has a higher soft tissue resolution compared to CT. As such, it provides a better delineation of paranasal sinuses tumours as the images can be used to differentiate the actual tumour from the surrounding mucosal inflammation and retained sinonasal secretion as well as intracranial extension of the tumours [10]. This research aimed at determining the pattern of radiographic findings in paranasal sinuses and postnasal space and also to identify common pathologies detectable on plain radiographs of paranasal sinuses and postnasal space with their age and gender distributions. Hence, the study will provide a baseline data that can be used for paranasal and postnasal space for subsequent researches. Likewise, the result obtained from the study will enlighten the radiographers, radiologist and referring physicians on the possible radiographic findings in paranasal sinuses and postnasal space within the study locality.

Materials and Methods

A retrospective descriptive study design was adopted for the study. A secondary source of data was obtained using data capture sheets from the archives of Radiology and Otorhinolaryngology departments of Usmanu Danfodiyo University Teaching Hospital (UDUTH) and Specialist Hospital Sokoto (SHS). The data were obtained by examining the patient's radiological report sheets. Three hundred and eighty (380) radiological reports of patients that underwent paranasal sinuses and postnasal space radiographic examinations from January 2015 to August 2018 at UDUTH and Specialist Hospital, Sokoto were enrolled.

A convenient sampling technique was used for the study with Taro Yamane's formula used with sample size of 195. Paranasal sinuses and postnasal space radiographs with age, gender, date and radiological report were included. Radiographs outside the specified scope of the study were excluded. Both descriptive and inferential statistics were adopted and the data was analyzed using statistical package for social science (SPSS) version 23. The data were presented using frequency table, bar charts and pie charts. Ethical approval was obtained from ethical clearance committee of UDUTH and SHS.

Results

A total of 195 paranasal sinuses and postnasal space radiological reports were reviewed consisting of 103 for paranasal sinuses and 92 for postnasal space . Out of 103 paranasal sinuses reports, 45 (43.69%) were males and 58 (56.31%) were females. Their age range was 4-80 years (29.86±17.74). Table 1 shows the age distribution of patients and their frequencies. The age range of 24-33 had the highest frequency, followed by the 4-13 age group. The 74-83 age group however had the lowest frequency.

From 103 paranasal sinuses radiographs evaluated, rhinitis was the commonest radiographic finding in 45 radiographs (43.69%), followed by rhinosinusitis in 34 (32.02%), with sinusitis and normal being the least findings in 5(4.85%) (Figure 1). Gender distribution of paranasal sinuses among the different findings is represented in Figure 4.2. The highest frequency was seen under 4-13 age group in females (14;13.59%) followed by the 24-33 age group in males (13;12.62%). Sinusitis in females within 74-83 age group had the least frequencies (1;0.97%).

Out of 92 postnasal space reports, 57 (61.96%) were males and 35 (38.04%) were females. Their age range was 0.25-19 years (4.85±2.66) as shown in table 4.2. The age range of 0-2 had the highest frequency, followed by the 3-5 age group. The 18-20 age group however had the lowest frequency. Out of the 92 postnasal space radiological reports evaluated, adenoid hypertrophy was the most common radiographic finding consisting of 72 (78.26%), followed by normal finding 15(16,30%) with adenitis and nasopharyngeal polyp being the least 1 (1.09%) (Figure 3). Gender distribution in postnasal space findings is represented in Figure 4.4. The highest frequency was seen under 0-2 age group in males (21;22.83%) followed by 3-5 age group in males (15;16.30%).

Table 1. Age distribution for paranasal sinuses.

| Age range. | Frequency. | Percentage (%) |
|------------|------------|----------------|
| 4-13 | 22 | 21.36 |
| 14-23 | 19 | 18.45 |
| 24-33 | 23 | 22.33 |
| 44-53 | 14 | 13.59 |
| 54-63 | 07 | 06.80 |
| 64-73 | 02 | 01.94 |
| 74-83 | 01 | 0.97 |
| Total | 103 | 100 |

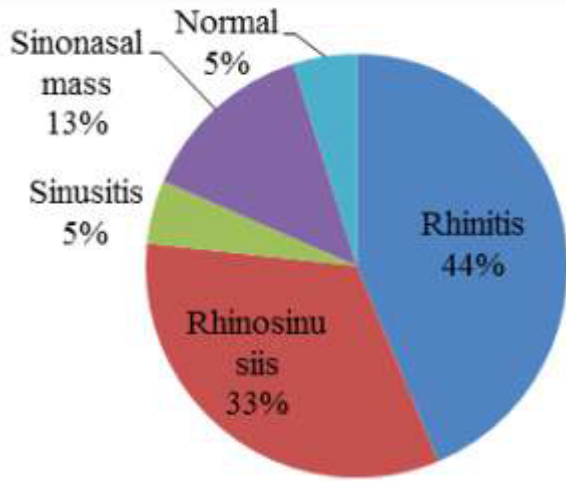


Fig. 1. Distribution of radiographic findings in paranasal sinuses.

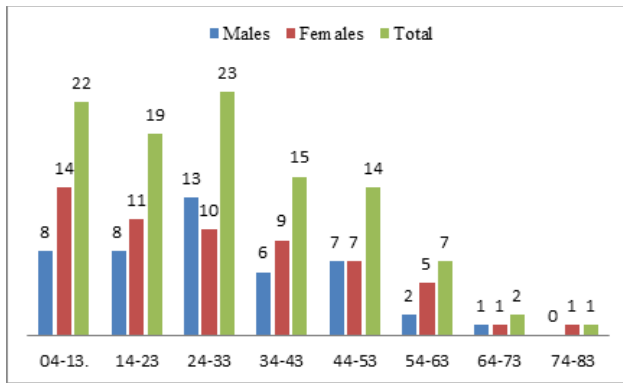


Fig 2. Gender distribution in relation to the age groups for paranasal sinuses.

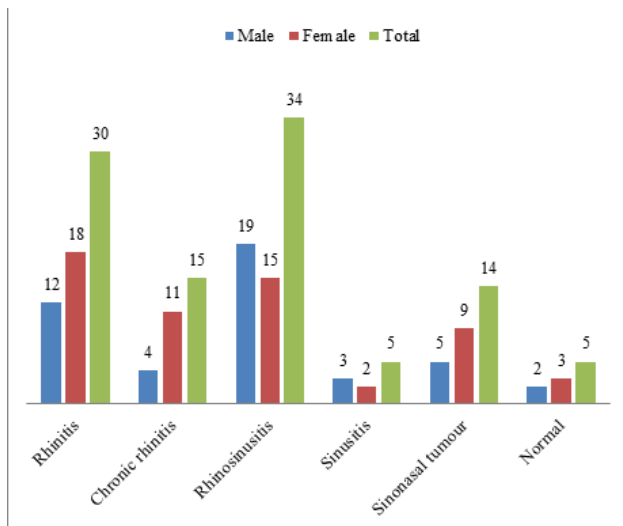


Fig 3. Gender distribution of paranasal sinuses in relation to the radiographic findings

Table 2: Age distribution for postnasal space subjects.

| Age range | Frequency | Percentage (%) |
|-----------|-----------|----------------|
| 0-2 | 33 | 35.87 |
| 3-5 | 24 | 26.09 |
| 6-8 | 20 | 21.74 |
| 9-11 | 10 | 10.87 |
| 12-14 | 02 | 2.17 |
| 15-17 | 02 | 2.17 |
| 18-20 | 01 | 1.09 |
| Total | 92 | 100 |

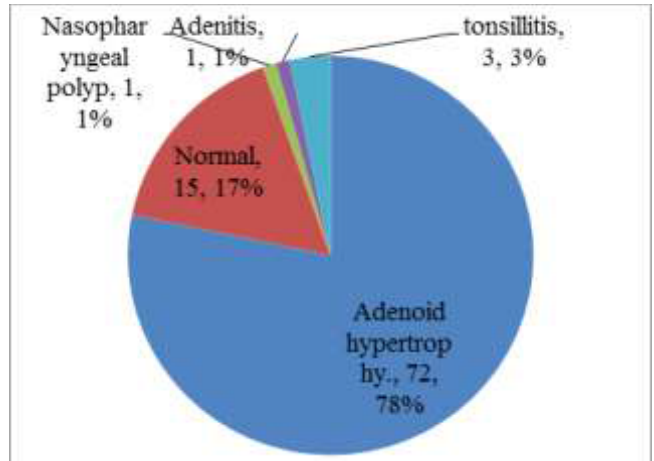


Fig.4. Distribution of radiographic findings in postnasal space.

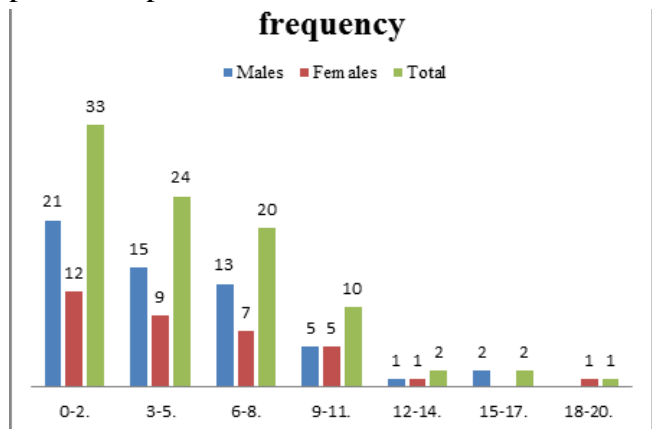


Fig. 5 Gender distribution for postnasal space findings in relation to the age group.

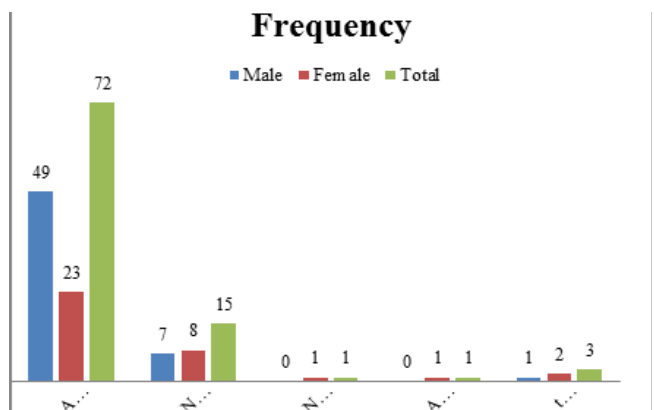


Fig. 6 Gender distribution for postnasal space findings in relation to the radiographic findings.

Discussion

Plain radiography is the first line imaging modality of choice used for the evaluation of paranasal sinuses and post nasal space, although, it is of low sensitivity. This is due to the fact that, computed tomography has high sensitivity in detecting both paranasal and postnasal space pathologies [4]. However, plain radiography can depict pathologies associated with the presence of air-fluid level, haziness of sinuses, bony engorgement and destruction, mucosal thickening and presence of soft tissue mass [3].

Out of 103 paranasal sinuses evaluated, rhinitis was the most common finding (45; 48.91%). This was similar to the common radiographic finding obtained by Lilly et al. [3] where they concluded that engorged turbinates due to allergy (rhinitis) was seen in 43.9% of patients and was the commonest. Similarly, rhinosinusitis 34 (33.02%) being the second most common radiographic finding was also similar with their study (13.6%), although the percentages differ as they only consider patients with chronic symptoms of paranasal sinuses diseases in their study. The difference could also be explained by the smaller sample size used in their study which was 66 patients and age range of 17-65 years.

A similar study by Verma et al. [11], which identified the role of radiological imaging in the evaluation of paranasal sinuses diseases, concluded that inflammatory diseases were the most prevalent (86.0%) which is similar to what was observed in this study (86.96%). The inflammatory disease findings in this study were rhinitis (48.91%), rhinosinusitis (33.02%) and sinusitis (4.83%) (Figure 4.2). The age distribution of the findings showed that 24-33 age group has the highest frequency (23; 22.33%) which is similar with the finding obtained by Hussein et al. which was 19-29 years in their study. They also found out females (54%) were more affected than males (46%). This is similar to the finding in this study as females (58; 56.31%) were seen to be more affected than males (45; 43.69%).

Adenoid hypertrophy (71; 78.26%) was the most common finding followed by normal (15; 16.3%) finding in this study. This was similar to the finding by Adibeji et al [12]. which identified that adenotonsillar hypertrophy was the most common finding. Likewise, Abdullah et al. [13]

found out that adenoid hypertrophy was the most common radiographic finding in 84% of the subjects. Although the distribution of the radiographic finding was similar to our study with adenoid hypertrophy being the most common postnasal space radiographic finding, but the variation in the frequency of their findings may be attributed to the nasoendoscopy used which has higher sensitivity in addition to postnasal space radiograph.

The age distribution from this study is similar to study by Adibeji et al. [12] that revealed under 2 years are more affected. This varied from the finding by Taha et al. [7] which showed that 3-5 age group has the highest frequency. The difference may be due to larger sample size used in their study. This study also showed male dominance in 57(61.95) over females 35(38.05%). This is in agreement to the gender distribution found by Kolo et al., Abdullah et al. and Adibeji et al. whose studies revealed male predominance [12,13,14].

Conclusion

Plain radiography is a valuable radiographic examination for the assessment of both paranasal sinuses and postnasal space. Rhinitis was the most common radiographic finding in paranasal sinuses and adenoid hypertrophy was the most common in postnasal space.

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