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A Retrospective Study of Dental Radiography Patterns and Discoveries at the University Teaching Hospital, Southeast Nigeria

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Abstract:- A retrospective study was carried out to understand the pattern of findings in dental radiographs in university of Nigeria teaching Hospital, Enugu. It is a study where information was obtained from patient's folders at the record department in dental unit in the institution understudy. This study reveals that the number of patients who underwent dental radiography within the 12months of this study, whose records were retrieved and studied, totaled 200. The study was carried out from 31st January 2012 to 31st January 2013. In this study, more females (n=128, 64%) presented for dental radiograph than males (n=72, 36%). The study also revealed that patients with the age group of 21-30 (n=86, 43%) had the highest number of patients examined. A wide pattern of findings were encountered in dental radiography, where the most common ones are acute periodontitis (n=49,24.5%), chronic gingivitis (n=29,14.5%), dental caries (n=19,9.5%), fracture and irreversible pulpitis (n=11,5.5%) respectively, reversible pulpitis, ameloblastoma and pericoronitis (n=10,5%) respectively. The result obtained helps in understanding the pattern of findings in dental radiographs and also ensures there is availability of document on the pattern of finding for future references.

Keywords:- *Dental Radiography, Acute Periodontitis, Chronic Gingivitis, Irreversible Pulpitis, Dental Caries.*

I. INTRODUCTION

Dental radiography is the x-ray examination of the teeth and associated structures. It is the most common radiographic procedure done in cases of dental and maxillofacial disorders. Dental radiographs on the other hand are the x-ray images of the teeth, bones, and surrounding soft tissues. They are among the most valuable tools a dentist has for keeping mouth and teeth healthy[1]. By understanding what the structures of the mouth look like normally on an x-ray film, dentists can diagnose problems in the teeth[2] and jaws. For adults, radiographs can: show areas of decay that may not be visible with an oral examination, especially small areas of decay between teeth, identify decay occurring beneath an existing filling, reveal bone loss that accompanies gum disease, reveal changes in the bone or in the root canal resulting from infection, assist in the preparation of tooth implants, braces, dentures, or other dental procedures, reveal an abscess (an infection at the root of a tooth or between the gum and a tooth) and reveal other developmental abnormalities such as cysts and some types of tumors. For children, radiographs can be used to: identify decay, determine if there is enough space in the mouth to fit all incoming teeth, determine if primary teeth are being lost quickly enough to allow permanent teeth to come in properly, check for the development of wisdom teeth and identify if the teeth are impacted (unable to merge through the gums)[3].

Dental radiographs are divided into two main categories: intra-oral, which means that the x-ray film is inside the mouth and they are the most common radiographs made[4], and extra-oral, which means that the x-ray film is outside the mouth. The most frequently requested intra-oral radiography are bitewing radiography, periapical radiography and occlusal radiography, while the most frequently requested extra-oral radiography are dental panoramic radiography, oblique lateral radiography and cephalometry[5],[6].

Several studies have been done on this subject, this includes; [7], [8], [9], [10], [11], [12], [13], [14], [15], [16], [17], [18], [19], [20], [21], [22], [23], [24], [25], [26], [27], [28], [29], [30], [31], [32], [33], [34], [35], [36], [37], [38], [39], [40], [41], [42], [43], and [44]. Nevertheless, Dentistry and dental radiography has recently been introduced into health care at University of Nigeria Teaching Hospital Ituku-Ozalla, Enugu and the value into oral disease is yet to be documented, this also includes their demographic variables. Hence, there is need to determine the age and sex distribution of the patient, identify the radiographic feature, determine the common location of these dental pathologies identified in dental radiographs and identify common radiographic procedures undertaken at the department.

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The outcome of this research will help in understanding the pattern of findings in dental radiographs which may improve the proper management of patients, it will also help to have a document on the pattern of findings in dental radiographs which will aid in reference and research purposes.

II. RESEARCH METHODOLOGY

➢ *Target Population:*

Target population for this study, includes all cases of dental radiography done in the dental unit at University of Nigeria Teaching Hospital Ituku- Ozalla, Enugu from 31st January 2012 to 31st January 2013.

➢ *Inclusion and Exclusion Criteria*

Folders with matching records were used while folders without matching records were excluded.

➢ *Sampling Technique*

A convenient sampling method was used in the course of retrieving the patient's folders based on the purpose of the study.

➢ *Instrument of Data Collection*

The source of data was from patient's folders. The dental unit had a record department where documents of patients were properly kept for future purposes in the folders. Data was therefore collected from these already existing folders by randomization. These folders that had both radiographs and clinical findings were used in this study. In the other hand, those folders without stipulated information as stated earlier were excluded.

➢ *Method of Data Analysis:*

Data collected was tallied and analyzed in line with the objectives of the study using appropriate descriptive statistical tools such as percentages and frequencies and presented in tabular forms in the result section of this research.

- Bio-data comprises information about the patient's age and sex that are contributory to the patient's history. These data are analyzed using frequency and percentage and are presented using tables.
- Radiological findings: these are the different reports contained in the patients' folders. The reports include dental caries, pulpitis, periodontitis etc, these will be varied with patient's age and sex.

III. RESULTS

➢ *Data Presentation*

The following tables aided in accomplishing the objectives of this research.

Table 1 Distribution of Age and Sex of the Patients

Age	Male	Female	Frequency	Percentage
0-10	10	10	20	10
11-20	8	17	25	12.5
21-30	35	51	86	43
31-40	4	21	25	12.5
41-50	5	11	16	8
51-60	4	4	8	4
61-70	3	7	10	5
71—80	3	6	9	4.5
>80	0	1	1	0.5
Total	**72**	**128**	**200**	**100**

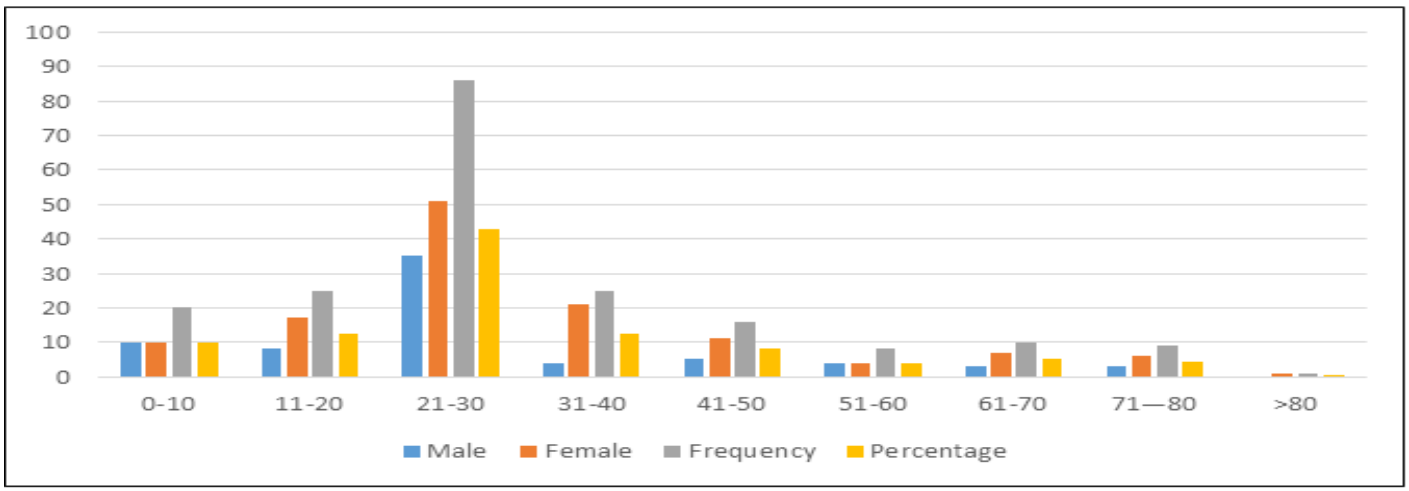

Fig 1 Distribution of Age and Sex of the Patients

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Table 1 shows that patients within the age group of 21-30 (n=86, 43%) had the highest frequency, followed by the patients within the age group of 11-20 and 31-40 (n=25, 12.5%) respectively, while those within the age range greater than 80 (n=1, 0.5%) had the least frequency. This table also shows that more females (n=128) had dental pathologies than males (n=72). This is perfectly represented in Figure 1

Table 2 Distribution of Dental Radiography Findings According to Gender of the Patients

Findings	Male	Female	Frequency	Percentage
Acute periodontitis	18	31	49	24.5
Chronic periodontitis	2	3	5	2.5
Reversible pulpitis	1	9	10	5
Irreversible pulpitis	3	8	11	5.5
Dental caries	10	9	19	9.5
Pericoronitis	3	7	10	5
Acute gingivitis	1	1	2	1
Chronic gingivitis	10	19	29	14.5
Retained root	2	3	5	2.5
Fracture	7	4	11	5.5
Dentoalveolar abscess	3	6	9	4.5
Impacted teeth	4	4	8	4
Periapical abscess	1	1	2	1
Ameloblastoma	1	9	10	5
No findings	6	14	20	10
Total	**72**	**128**	**200**	**100**

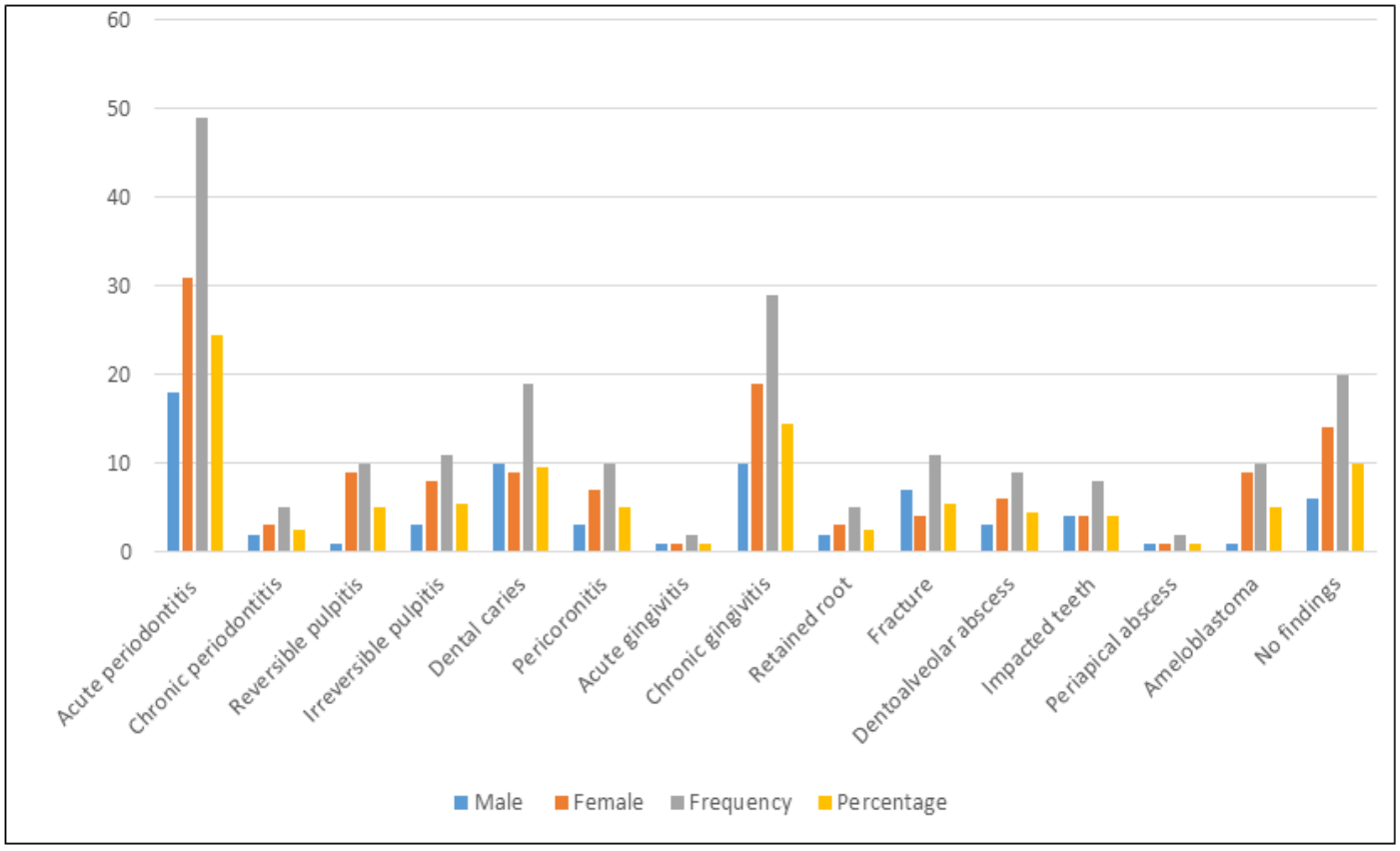

Fig 2 Distribution of Dental Radiography Findings According to Gender of the Patients

Table 2 shows that female suffering from acute periodonitits had the highest frequency (n=31), followed by female suffering from chronic gingivitis (n=19) while males and females suffering from acute gingivitis and periapical abscess had the least frequency (n=1) respectively. This table also shows that acute periodontits 24.5% (n=49) is the most common finding followed by chronic gingivitis 14.5% (n=29). The least common findings are acute gingivitis and periapical abscess 1% (n=2) respectively. These findings are shown in Figure 2

Table 3 Location of Dental Radiography Findings

S/N	Findings	Location
1	Acute periodontitis	Periodontal pockets (spaces the between gums and the teeth)
2	Chronic periodontitis	Periodontal pockets
3	Reversible pulpitis	Pulp cavity particularly at the coronal pulp
4	Irreversible pulpitis	Pulp cavity particularly at the radicular pulp.
5	Dental caries	Enamel to dentine
6	Pericoronits	Around the crown of a tooth, particularly at third molar
7	Acute gingivitis	Upper and lower quadrant (gum) and sulcus.
8	Chronic gingivitis	RUQ, RLQ, LUQ and LLQ particularly at the Gum or gingival
9	Retained root	Root
10	Fracture	Jawbone – upper and lower part
11	Dentoalveolar abscess	Jawbone – upper and lower part
12	Impacted teeth	UQ and LQ particularly at the incisor and canine
13	Periapical abscess	Periapical tissues (apex of a tooth)
14	Ameloblastoma	Jaw – UQ & LQ

- Table 3 Show that most of the dental pathologies occur at the upper quadrant and lower quadrant respectively.

Table 4 The Types of Dental Radiographic Procedure used in Dental Radiography Findings

S/N	Findings	Radiographic procedure
1	Acute periodontitis	Intra – oral (bitewing, periapical)
2	Chronic periodontitis	Intra-oral (bitewing, periapical)
3	Reversible pulpitis	Intra – oral
4	Irreversible pulpitis	Intra – oral
5	Dental caries	Intra-oral (Bitewing, periapical)
6	Pericoronitis	Intra-oral
7	Acute gingivitis	Intra-oral
8	Retained root	Intra-oral (occlusal)
9	Fracture	Extra-oral (lateral oblique)
10	Dentoalveolar abscess	Intra-oral (occlusal)
11	Impacted teeth	Intra-oral (periapical)
12	Periapical abscess	Intra-oral (occlusal)
13	Ameloblastoma	Plain radiography

Table 4 shows that intra-oral radiography is the one used mostly in the diagnosis of the dental pathologies in the institution understudy especially the periapical radiography.

Table 5 Dental Radiography Findings and their Radiographic Features

S/N	Findings	Radiographic features
1	Acute periodontits	Periapical radiograph shows slight widening of periodontal ligament. The apex of the lower pulp is still open.
2	Reversible pulpitis	Periapical radiograph reveals no area of coronal radiolucency but there is no pulp symmetry in the lower quadrant, there is evidence of vertical bone loss.
3	Irreversible pulpitis	Periapical x-ray reveals grossly carious of upper quadrant and lower quadrant with carious lesion communicating with the pulp. It also shows a layer of dentine carious lesion and pulp.
5	Ameloblastoma	Plain radiograph shows well circumscribed lesion extending from the canine region to the medial aspect of the 2nd molar with no absorption of the root of involved cyst, lower border of the mandible is intact. Hazy opacity involving the left maxillary sinus and the maxilla.
6	Periapical abscess	Periapical x-ray of upper quadrant reveals periapical radioluscency around the upper quadrant due to recurrent caries.
7	Chronic periodontits	Periapical radiograph shows overlapping amalgam around upper quadrant and radiopacity in upper quadrant due to previous amalgam filling. Gum is slightly inflamed. It also shows bone density changes due to loosening of the teeth in the sockets.
8	Impacted teeth	Radiograph shows crowded structures that are out of alignment.
9	Pericoronitis	Periapical radiograph reveals gross radioluency on the crown of the upper quadrant with complete root resorption of both teeth. Radioluency noted on mesial side of crown.
10	Facture	Plain radiograph shows a step deformity on the ramus/ of the right mandible. An irregular sclerotic linear area is also seen running through the level, suggestive of a poorly healed

		fracture.
11	Gingivitis	Periapical radiograph shows radiopaque deposit on the surface of the teeth at their necks. It shows a bony defect due to bone loss.

Table 5 shows that teeth appear lighter on the radiograph while dental caries, infections, other changes in the bone density, and the periodontal ligament appear darker on the radiograph. Dental restorations like fillings, crowns may appear lighter or darker, depending on the density of material.

IV. DISCUSSION

The purpose of any radiographic examination is ultimately to achieve the well being of the patients by obtaining diagnostic quality images with as less radiation risk as possible. Dental radiography is an area that has been identified to require a special attention in obtaining images of diagnostic qualities.

This study reveals that the number of patients who underwent dental radiography within the 12months of this study, whose records were retrieved and studied, totaled 200. This number is quite statistically significant for such a period coupled with the fact that some folders had no radiographs on them based on their clinical diagnosis, while some could not be done due to power outage and most times such patients do not come back for the procedure; this shows that the incidence of dental pathologies is high in the health institution studied.

When compared with the findings made by [28], he retrospectively reviewed 500 pediatric patients who had visited the department of oral diagnosis and radiology at dentistry faculty and had a panoramic radiograph taken between 2008 and 2009.The following information was obtained from the patients' files and panoramic radiographs: gender, age and presence or absence of lesions. Panoramic radiographs were evaluated by four oral and maxillofacial radiologists.

In this study, more females (n=128, 64%) presented for dental radiograph than males (n=72, 36%). Study also revealed that patients with the age group of 21-30 (n=86, 43%) had the highest number of patients examined. A wide pattern of findings were encountered in dental radiography, where the most common ones are acute periodontitis (n=49,24.5%), chronic gingivitis (n=29,14.5%), dental caries (n=19,9.5%), fracture and irreversible pulpitis (n=11,5.5%) respectively, reversible pulpitis, ameloblastoma and pericoronitis (n=10,5%) respectively. fewer common findings include dentoalveolar abscess (n=9,4.5%), impacted teeth (n=8,4%), retained root and chronic periodontitis (n=5,2.5%), acute gingivitis and periapical aabscess (n=2,1%).

When compared to related literatures, in the study of [28],the 72 incidental findings consist of 27 apical ostitis as the most incidental findings followed by 12 impacted teeth, 9 missing teeth,8 fractured tooth, 7 follicular cyst while the least incidental findings of his is deformed tooth(n=1). [32] reported a 21% prevalence of jaw and dental anomalies in the panoramic radiographs of children and adolescents between 10 and 15 years in New Zealand and the most frequent findings were missing and deformed teeth; [29] examined the panoramic radiographs of black children and found that 4.4% had congenitally missing teeth and 1.5% had supernumerary teeth.

This study also shows that most females (n=31) have acute periodontitis while most males (n=18) have the dental pathology. Males also had more count than females in some cases like in fracture (n=7) and dental caries (n=10).

Secondly, apart from the above remarks, other findings were relatively distributed evenly between the male and female categories, in some cases like acute gingivitis (n=1), impacted teeth (n=4), and periapical abscess (n=1) respectively.

V. SUMMARY OF FINDINGS

This study was on the pattern of findings in dental radiographs in University of Nigeria Teaching Hospital Ituku-Ozalla, Enugu. Folders of all patients who came for dental radiographic investigations formed the largest population. A total of 200 patients' folders were included in the study. From the study, the following were noted;

- Dental pathologies that are more common in the health institution understudy is acute periodontitis (n=49, 24.5%), followed by chronic gingivitis (n=29, 14.5%) while the least are acute gingivitis (n=2, 1%) and periapical abscess (n=2, 1%) respectively.
- Patients within the age range of 21-30 (n=86,43%) were recorded highest while those within the age range greater than 80 (n=1,0.5%) had the least frequency.
- More females had dental pathologies than males. Females (n=128, 64%) and males (n=72, 36%).
- The findings also made us known that it was student that had more dental pathologies than others. This was reflected in the appendix 1.

VI. CONCLUSION

This study found that incidence of dental pathologies is high in the health institution understudy which estimated at 200 cases per year. With dental radiograph, a wide pattern of findings were encountered: the most ones are acute periodontitis (n=49, 24.5%), chronic gingivitis (n=29, 14.5%), dental caries (n=19, 9.5%), irreversible pulpitis and fracture (n=11, 5.5%) respectively. The analysis on age and sex distribution showed that more females had dental pathologies than males and that dental pathologies are commonly found among young adults (21-30 years) as identified by dental radiography findings.Conclusively, dental radiography is a main tool for a thorough exploration in dentistry because of its help in defining treatment needs

and relating treatment outcome to various technical and clinical factors of endodontic therapy. Comparative analysis between digital and conventional radiography in the diagnosis of dental pathologies is needed. This research should be repeated in Northern geo-political zones of Nigeria to compare the outcomes. There should be awareness programmed for female by Health Professionals to educate them on dental pathologies which may improve the proper management of their health. There should be workshops or seminars for training and retraining of clerical workers for efficient record keeping, preventing misfiling and loss of folders.

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