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Research Paper

Inquest of Antibiotic use at the Dental Unit of Bingham University Teaching Hospital, Jos Nigeria

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ABSTRACT: *Antibiotic therapy has become follow-up to surgical and endodontic treatments as dental practitioners are one of the major prescribers of antibiotics globally. Antibiotic prescribing guidelines for dentists monitoring, and evaluation of routine compliance with the guidelines would help to ensure standard practice in antibiotic stewardship. The study aimed to evaluate the antibiotic prescribing pattern in the Dentistry department of Bingham University Teaching Hospital Jos, Nigeria.*

This was a retrospective cross-sectional study using data from the medical record of 200 male and female patients between the ages of 3 and 86 years, registered at the Dentistry Department of the Bingham University Teaching Hospital (BhUTH), Jos Nigeria, from January 2022 to December 2024. The information collected included the age and sex of patients, cases (surgical and non-surgical), and antibiotic prescribed. Results showed 176 (88%) non-surgical and 24 (12%) cases, with most of the patients 46 (23%) - age range of 21-30 years. Moreover, a total of 7 different antibiotics were prescribed capturing generic drugs 222 (67.1%) and proprietary/branded named drugs 109 (32.9%), there were more male patients (55.7%) than female patients (48.3%). The most frequently prescribed antibiotic in this survey was metronidazole (45.6%), followed by amoxicillin (28.7%) and augmentin (13 %). Others were, ampiclox (10.6 %), clindamycin (0.9 %), ciprofloxacin (0.3 %), and doxycycline (0.9 %).

Penicillins (Amoxicillin/Augmentin/Ampiclox) are the first-line treatment option for odontogenic infections, Metronidazole and while Amoxicillin + Metronidazole combination therapy are the most prescribed by the dental practitioners in BhUTH Dental Clinic Jos Nigeria. Avoidance of over prescription of broad-spectrum antibiotics as it poses a threat of global resistant to it as well as adherence to antibiotic guidelines are recommended.

Penicillins (a/a/a) are the first-line treatment options for odontogenic infections. Metronidazole and Amoxicillin+Metronidazole combination therapy were the most prescribed by the dental practitioners in BhUTH Dental clinic Jos Nigeria. Thus, avoidance of over prescription of broad-spectrum antibiotics as it poses a threat of global resistance as well as adherence to antibiotic guidelines are recommended.

KEYWORDS: *Penicillins, Metronidazole, Prescription, Dental Practitioners, Combination Therapy, BhUTH*

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I. INTRODUCTION

Antibiotics in whatever form have become one of the most abused drugs in resource limited settings due to its incessant use without prescription. However, the WHO antibiotics stewardship focused its attention to mitigate antibiotics resistance. Bacterial infections are common in dental and oral clinical practice [1]. The increasing prevalence of antibiotic resistance (ABR) has been traced to misuse and overuse of antibiotics [2].

Antimicrobial resistance (AMR) is an alarming global public health concern, threatening the effective treatment of common infections [3], and has now emerged as a chronic public health problem globally, with the forecast of 10 million deaths per year globally by 2050 [4]. Important drivers of AMR include, overprescribing and inappropriate prescription of antibiotics by practitioners, as well as the widespread availability of antibiotics without a prescription in many countries or via Internet [5], [6].

The 2019 WHO Access, Watch, Reserve (AWaRe) antibiotic classification framework aims to prevent irrational prescribing of antibiotics used to treat widespread infections [7]. Dental infections are composed of different types of bacteria, such as gram-positive, gram-negative, and anaerobes [8], It is however a common practice for dentists use antibiotics as an adjunct to prevent infection at the treatment site, especially clinical scenarios involving oral infections that require antibiotics [9]. Antibiotics are regularly prescribed by dental professionals in their practice, for the purpose of dental treatment and prevention of infection [10]. In the healthcare sector, 3% to 11% of total antibiotic prescriptions are from dentistry [11], [12], [13] to prevent infections. In the absence of a full spectrum of evidence-based guidelines for the appropriate use of antimicrobial agents, dentists, including periodontists, remain a highly frequent antibiotic prescribing group [14]. A survey revealed gaps in practitioners' knowledge, attitude and practice revealed that, 83 (63.85%) of the practitioners kept themselves updated about antibiotic guidelines and news, but many (94, 72.31%) were unaware of the WHO's access, watch, reserve (AWaRe) and antimicrobial stewardship concepts (103, 79.23%) [9].

The need for continuous monitoring and evaluation of antibiotic prescribing practice has become imperative, for the fact that, it is debatable nowadays if the incomplete intake of the full treatment dose can also be considered a cause of increased antibiotic resistance, since, especially in preoperative regimes, single-dose antibiotics prophylaxis has become a common practice not only in dentistry and is supposed to reduce the risk of resistance [15], [16], [17].

Despite the existence of established guidelines for the proper use of antibiotics, including Dentists' Drug and Prescription Guide [18], Drug Prescribing for Dentistry (Scottish Dental Clinical Effectiveness Programme [19], and Antibiotic Prescribing Guidelines for Dentists [20] amongst others monitoring, and evaluation of routine compliance with the guidelines would help to ensure standard practice in antibiotic stewardship, thus the study aimed to evaluate the antibiotic prescribing pattern in the Dentistry department of Bingham University Teaching Hospital Jos, Nigeria.

II. MATERIALS AND METHODS

This was a retrospective cross-sectional study using data from the medical record of 200 male and female patients between the ages of 3 and 86 years, registered at the Dental Department of the Bingham University Teaching Hospital, Jos Nigeria, from January 2022 to December 2024. The information collected included the age and sex of patients, cases (surgical and non-surgical), and antibiotic prescribed.

The cases were categorized into Surgical and Non-Surgical. These categories aligned with general medical and dental classification systems where surgical procedures involve incisions, anesthesia, or significant tissue manipulation, while non-surgical procedures involved surface level or less invasive techniques. Cases requiring special procedures, including tooth extractions involving incisions and other technical interventions were considered as surgical. Dental Curettage (Subgingival Curettage), which involved specialized techniques was also considered as a surgical procedure. Oral and Maxillofacial surgeries were also registered under surgical cases. Procedures such as Scaling and Polishing, Normal (Simple) tooth extractions, and Root Canals were classified as non-surgical.

Ethical Approval

This study was approved by the health research ethics committee of the Bingham University Teaching Hospital (BhUTH), Jos Nigeria, with reference – NHREC/21/05/2005/00610.

Statistical Analysis

Data collected were analyzed and presented in contingency table and charts.

III. RESULTS AND DISCUSSION

Having analyzed 200 medical record sheets from 200 outpatients prescribed with various antibiotics during January 2022-December 2024 showed the following results:

Most of the patients 46 (23%) fall within the age range of 21-30 years – *Table 1*. Orofacial infections mostly occur during the age of 21–40; besides, the prevalence of the disease is not gender-related [21, 22]. This is consonance with our study, as most of the patients in this study fall between the ages of 21-40 (*Table 1*).

Table 1: Age Distribution

Distribution	Number	Percentage (%)
≤10	27	13.5
11-20	23	11.5
21-30	46	23
31-40	34	17
41-50	33	16.5
51-60	25	12.5
61≥	12	6
Total	200	100

There were more non-surgical cases 176 (88%) with the females slightly higher than the males (*Figure 2*), compared to the surgical cases 24 (12%) that also has slightly higher males than the females *(Figure 1*).

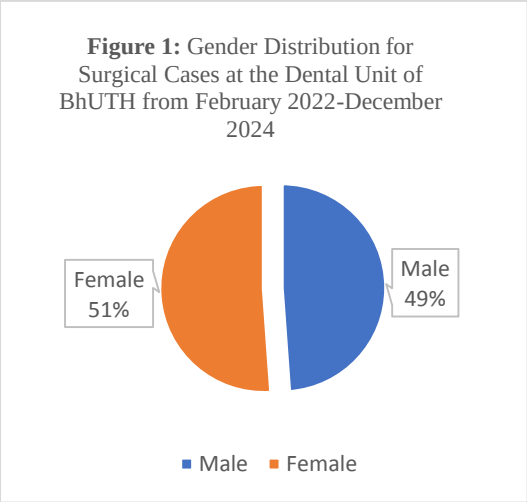


Figure 1: Gender Distribution for Surgical Cases at the Dental Unit of BhUTH from February 2022-December 2024

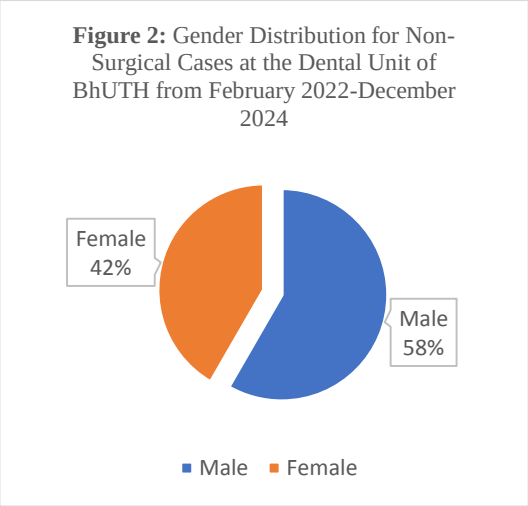
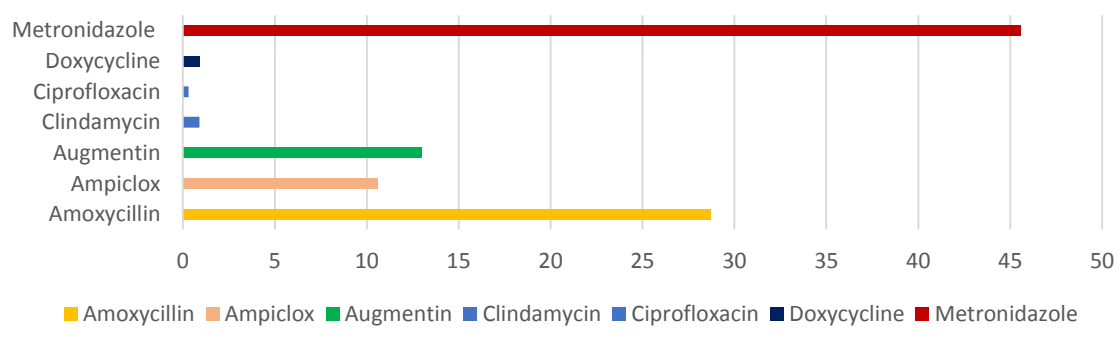


Figure 2: Gender Distribution for Non-Surgical Cases at the Dental Unit of BhUTH from February 2022-December 2024

A total of 7 different antibiotics were prescribed in BhUTH Dental Clinic from January 2022 to December 2024, capturing. This included generic drugs 222 (67.1%) and proprietary/branded named drugs 109 (32.9%). There were more male patients (55.7%) than female patients (48.3%). The most frequently prescribed antibiotic in this survey was metronidazole (45.6%), followed by amoxicillin (28.7%) and augmentin (13 %). Others were, ampiclox (10.6 %), clindamycin (0.9 %), ciprofloxacin (0.3 %), and doxycycline (0.9 %) – *Figure 3*. Reciprocally, the commonly prescribed antibiotics in similar studies highlighted amoxicillin, followed by metronidazole as the most commonly prescribed antibiotics by dental practitioners [23], [24], [25]. Dental practitioners are the largest prescribers of metronidazole [26], nonetheless, reasons for the increased trend in the use of metronidazole in dental practice remain unclear (ARHAI, 2022) [27]. It should be noted that metronidazole should be considered as second choice for patients not allergic to penicillin or as an adjunct in severe infections [28], [29].

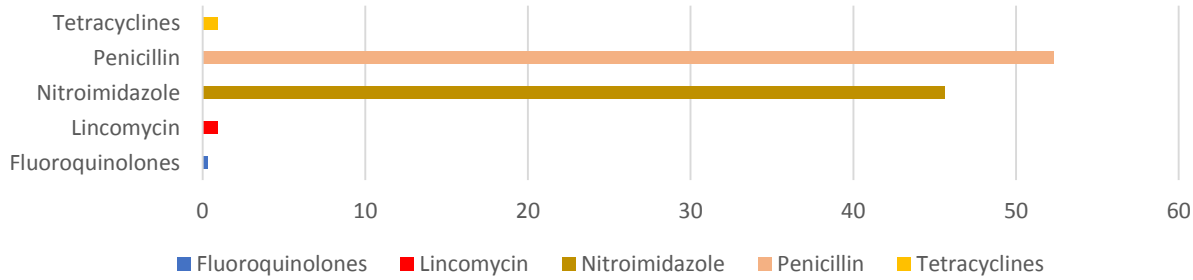
Figure 3:Most commonly prescribed antibiotics at the Dental Unit of BhUTH from February 2022-December 2024



In terms of class of antibiotics, the most frequently prescribed antibiotic class was penicillin (52.3%), followed by nitroimidazole (45.6%). Lincomycin, tetracyclines, and fluoroquinolones accounted for 0.9%, 0.9%, and 0.3%, respectively – *Figure 4*. This findings key into an assertion that the most common types of penicillin that are being administered for treatment of odontogenic infections are penicillin V, amoxicillin, and amoxicillin/clavulanic acid, and studies show that they have almost the same efficacy regarding the treatment of dental infections, nevertheless clindamycin could be administered instead of penicillin for patients with history of hypersensitivity or a positive skin test [30]. Nitroimidazoles e.g. metronidazole, nimorazole, and tinidazole are commonly administered to treat parasitic and anaerobic bacterial infections, also with metronidazole noticed to be prescribed for the treatment of acute infections by dental practitioners due to its great anti-anaerobic bacterial activity and low risk of toxicity [31], [32].

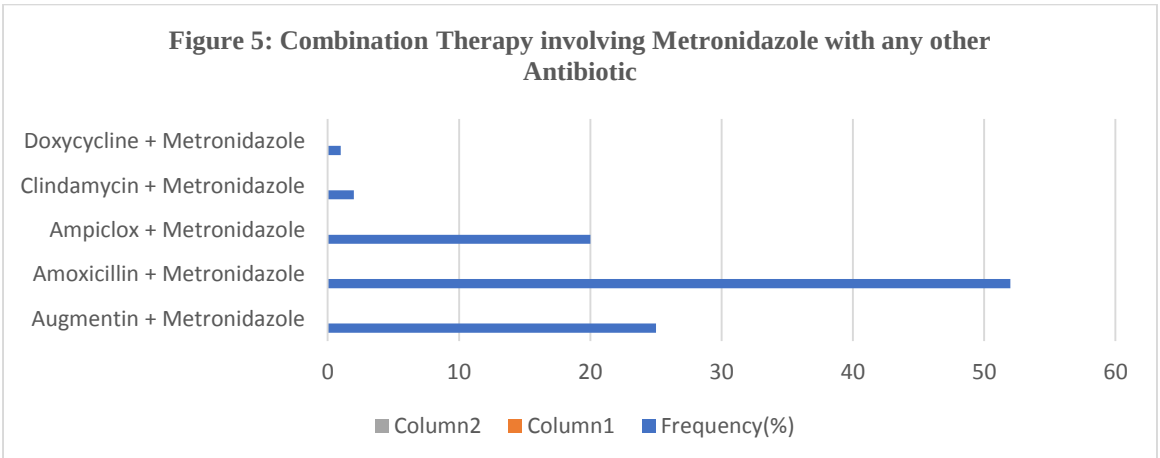
Our study further highlighted Penicillins, principally Amoxicillin/Augmentin/Ampiclox as the most prescribed antibiotics, thus a first-line treatment option for odontogenic infections in BhUTH Dental Clinic Jos Nigeria. This is a broad-spectrum antibiotic.

Figure 4:Most commonly prescribed Class of Antibiotic at the Dental Unit of BhUTH from February 2022-December 2024



Combination therapy involving metronidazole with any other antibiotic in our study showed that amoxicillin combined with metronidazole (52%) was highest followed by Augmentin combined with metronidazole (25%) – *Figure 5*. From an earlier study, the commonly prescribed antibiotics were amoxicillin and amoxicillin combined with metronidazole (56.3% and 16.9%, respectively) [33]. Yek *et al*, asserted that combined amoxicillin and metronidazole use as an adjunct to scaling and root planning leads to better clinical healing compared to mechanical treatment alone [34], while DeAngelis *et al.*, concluded that combined administration of amoxicillin and metronidazole could cover most of the oral bacteria [35].

Figure 5: Combination Therapy involving Metronidazole with any other Antibiotic



IV. CONCLUSION

Penicillins (a/a/a) are the first-line treatment options for odontogenic infections. Metronidazole and Amoxicillin+Metronidazole combination therapy were the most prescribed by the dental practitioners in BhUTH

Dental Clinic Jos Nigeria. Thus, avoidance of overprescription of broad-spectrum antibiotics as it poses a threat of global resistance as well as adherence to antibiotic guidelines are recommended.

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