



APPLICATION OF ATC/DDD METHODOLOGY TO EVALUATE OF ANTIBIOTIC USE IN DENTAL OPD OF GOVERNMENT AND PRIVATE HOSPITALS OF RAJASTHAN

Pharmacology

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ABSTRACT

Aim- A prospective cross sectional study conducted in Dental OPD of Government and Private hospital of Rajasthan.

Method- We have used the DDD per 1000 per day as the indicator for antibiotics consumption.

Results- Average number of drugs and antibiotic utilization higher in both hospitals. Less number of antibiotic prescribed by generic name in private hospital. According to DDD/1000/day in our study amoxicillin +clavulanic acid (56.21), Amoxicillin(13.9), Metronidazole (12.8) and Clarithromycin (8) were most consumed drugs in Dental OPDs of Government hospital. In Private hospital Azithromycin (33.33), Metronidazole (22.66), combination of amoxicillin and clavulanic acid (20), Doxycycline (16) and amoxicillin (16) were frequently used drugs.

Conclusion- Our study reveals that despite all the efforts taken by the Government and the WHO, the prescriptions in term of rationality remains inadequate so far.

KEYWORDS

Cross Sectional Study, ATC/DDD Methodology, DDD/1000/DAY

INTRODUCTION-

Antibiotics play a main role in dental practice for cure of disease and therapeutic use. Antibiotics cure diseases caused by various microorganisms at host sites in the oral cavity or distant sites due to spread of infection. In majority of cases, therapeutic antibiotics are prescribed to treat diseases of oral cavity (hard and soft tissue) after local treatment has failed. Treatment of Endodontic, oral surgical, and periodontal infections required antibiotics. Rational use of antibiotics in dental practice is very essential and it needs reasoning and knowledge regarding the selection of right antibiotics for the cause^{1,2}. In dentistry, antibiotics are used for the treatment of life-threatening disease and to treat postoperative infections. Penicillin is the first line of drug in treating odontogenic infections as they are mainly active against Gram-positive aerobes, intraoral anaerobes, organisms found in alveolar abscess, periodontal abscess, and necrotic pulps. Penicillin active against both Aerobic and anaerobic microorganisms. The prescription of antibiotics by the majority of the dentists is vastly on empirical basis without the need for antibiotics many times just to prevent unpleasant complications and prophylactic purpose. Belief that most of the oral diseases are infectious stimulates dentists for prescribing of antibiotics³. The right choice of antibiotic during anaerobic or aerobic infections is another major point of concern in general dentistry practice. There is evidence that antibiotics are prescribed inappropriately and irrationally in general dental practice with the increasing global problem of antimicrobial resistance, and the threat to public health, there is a need to rationalize the prescribing of antibiotics^{4,5}.

The ATC/DDD index is developed by the WHO. The WHO Collaborating Centre for Drugs Statistics Methodology has standardized this with the ATC/DDD (Anatomical Therapeutic Chemical/ Defined Daily Dose) index⁶. DDD/1000/days has been used internationally in the comparison of outpatient antibiotic use, and such data have been utilized to compare and to explain the national level of antibiotic use and resistance relationship⁷. Calculation of antibiotic utilization with the ATC/DDD index is independent from the price and box dimensions, and the daily dose for every antibiotic expresses the same DDD. By using this method, a comparison of antibiotic utilization can be made not only in clinics and hospitals but at the same time among countries. Generally, the ATC/DDD index is a universal parameter used in the evaluation of antibiotic use⁸⁻¹³.

The aim of this study was to evaluate the use of antibiotics in a Dental OPD of Government and Private hospital by using the ATC/DDD index which is accepted as a standard.

MATERIALS AND METHODS-

The present study was conducted in Dental OPDs of Government and Private hospitals of Rajasthan. It was a prospective cross-

sectional study. The study was based on the prescription pattern of antimicrobials agents prescribed in Dental OPDs of the Government and Private hospitals Jodhpur.

The study project was approved by the institutional Research Ethics Committee. The investigators signed a commitment term related to data utilization for the study purpose, ensuring the ethical aspects, according to Resolution. A total of 200 prescriptions were collected and copied from Dental OPD of public and private hospital.

Method Of Analysis

The WHO and International Network for Rational Use of Drugs (INRUD) have developed a standard set of drug use indicators.

Drugs were classified according to ATC classification. It was done for only those antibiotics for which it was available from drug statistics methodology (WHO collaborating center for drug statistics methodology 2013). DDD/1000/day was calculated out for individual drugs. DDD/1000/Day was done for only those drugs for which DDD was available from drug statistics methodology.

The formula is given below

$$\text{DDD/1000/Day} = \frac{\text{Total Number of Doses Unit} \times \text{Strength of Each Doses Unit} \times 1000}{\text{DDD} \times \text{Duration of Study} \times \text{Total Sample/Drug Size}}$$

DDD was calculated as per guidelines of ATC classification and DDD assignment as given by WHO collaborating center for the drug statistics methodology, Oslo, Norway.

Statistical Analysis

The Epi info version 7 was used for data analysis. The comparison of both hospitals was done by using the Chi-square test. For all the tests, a probability (p) value of less than 0.05 was considered to be significant.

RESULTS-

The present study was conducted in Dental OPD of Government and Private hospital of Rajasthan. The result showed that average number of drugs per prescription and percentage of antibiotics per prescription were high in both hospitals. Less number of Antibiotic injections were prescribed in both hospitals. Antibiotics prescribed by generic name was very low in private hospital (4.6%) as compared to Government hospital (71.77%). Although both hospitals were not fulfil the criteria of WHO (100%). According to DDD/1000/day in our study amoxicillin +clavulanic acid (56.21), Amoxicillin(13.9), Metronidazole (12.8) and Clarithromycin (8) were most consumed drugs in Dental OPDs of Government hospital. In Private hospital Azithromycin (33.33), Metronidazole (22.66), combination of Amoxicillin and Clavulanic acid (20),

Doxycycline (16) and Amoxicillin (16) were frequently used drugs.

Table-1- Who Core Indicators

WHOCareIndicators	Government Hospital	Private Hospital
1.Average number of drugs per prescription	3.8	4
2.Percentage of Antibiotics prescribed by generic name	71.77%	4.6%
3.Number of Antibiotics prescribed per prescription	32.54%	32.25%
4.Percentage of antibiotics injection per prescription	10%	15%
5.Percentage of antibiotics prescribed from EML	96.77%	95.57%

Table-2 ATC Code And DDD/1000/day Of Antibiotics In Government Hospital-

Antibiotics	ATCcode	DDD	DDD/1000/DAY
Ceftriaxone	J01DD04	2gm	1
Amoxicillin	J01CA04	1gm	13.9
Amoxicillin+clavulanic acid	J01CR02	1.5gm	56.21
Clarithromycin	J01FA09	0.5gm	08
Ciprofloxacin	J01MA02	1gm	01
Doxycycline	J01AA02	0.1gm	04
Clindamycin	J01FF01	1.2gm	3.33
Metronidazole	J01XD01	1.5gm	12.8

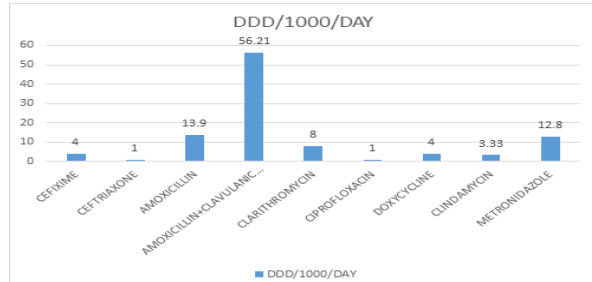


Figure-3 ATC Code And DDD/1000/DAY Of Antibiotics In Government Hospital-

Table-3 ATC Code And DDD/1000/DAY Of Antibiotics In Private Hospital-

Antibiotics	ATCcode	DDD	DDD/1000/DAY
Cefixime	J01DD08	0.4gm	03
Cefpodoxime	J01DD13	0.4gm	01
Cefuroxime	J01DC02	0.5gm	01
Phenoxymethyl Penicillin	J01CE02	2gm	0.6
Amoxicillin	J01CA04	1gm	14
Amoxicillin+clavulanic acid	J01CR02	1.5gm	20
Azithromycin	J01FA10	0.3gm	33.33
Erythromycin	J01FA01	1gm	10
Clarithromycin	J01FA09	0.5gm	12
Doxycycline	J01AA02	0.1gm	16
Clindamycin	J01FF01	1.2gm	5.5
Metronidazole	J01XD01	1.5gm	22.66
Fluconazole	J02AC01	0.2gm	4.5

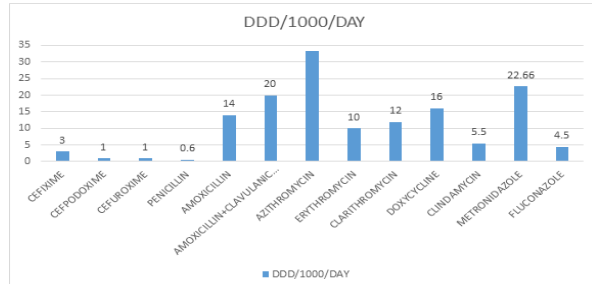


Figure-3 ATC Code And DDD/1000/DAY Of Antibiotics In Private Hospital-

DISCUSSION-

The average number of drugs per prescription is a chief index of the

standard of prescribing and the scope for review and educational intervention in prescribing practice. In our study The average number of drugs per prescription was quite high in both hospital. In primary health centers and hospitals polypharmacy may be justified to some extent because the doctors posted there are not very certain about the diagnosis due to lack of adequate diagnostic facilities. The major disadvantages of polypharmacy are -

1. The propensity to adverse drug interactions
2. Increase in cost of treatment
3. Reduced patient compliance
4. It discourages precise diagnosis

Polypharmacy as well as inappropriate prescribing is a major problem challenge that contributes to cost, adverse drug events, confusion, compliance issue, and errors in management. Drug utilization studies are essential to ensure that polypharmacy is minimized and safety for patients is maximized.

Excessive use of injections adds to the cost of sterilization and nursing resources and increases problems such as pain and local edema. Less number of antibiotic injections were prescribed in both hospitals which is a good indication. The high number of antibiotics were prescribed in the both hospital in our study. The number of antibiotics should be prescribed only for bacterial infections and as low as possible. The prolonged use of antimicrobials should be avoided, because it increases the possibility of antimicrobial resistance and adverse effect. It also increases the cost of treatment. Excessive usage and irrational use of antimicrobials was a major problem in all the studies. Less number of antibiotics prescribed by generic name in private hospital (4.6%). In a study conducted in Nepal, 32.6% drugs were prescribed with a generic name, which is much higher than what our study reported. Tempting promotional activities by pharmaceutical companies have been found to increase the number of prescriptions with brand names. WHO (1997) has recommended that 100 % of the drug should be prescribed by generic name.

The main advantages of generic prescribing are-

- 1.Reduce consumer cost through substitution of less expensive formulation for drugs prescribed by brand names¹⁴.
- 2.Changes from one brand to another lead to the possibility of therapeutic in equivalence.
- 3.Many non-proprietary names are difficult to remember and spell¹⁵

FDC of amoxicillin and clavulanic acid was used dental carries and root canal infections. The advantage of FDCs is the reduce frequency of drug doses to be taken by the patient and it improved patient compliance. But irrational combination increases adverse drug reactions and cost of therapy. The percentage of drugs prescribed from the essential drug lists was appropriate in both hospital. In Kathmandu 47.60% of drugs prescribed from EML¹⁶. In Bangladesh 52.90% of prescribed drugs were from the EML¹⁷. Most countries and studies choose the ATC classification system and the DDD measurement unit, developed by the WHO (2004). A study showed that the number of DDDs correctly indicate the number of antimicrobial prescription for outpatients at the national level¹⁸. Thus the number of DDDs is an acceptable measurement unit to express outpatient antimicrobial use and to benchmark countries for their level of antimicrobial drug consumption. We have expressed the prevalence of prescribing drugs as ATC classification and DDD/1000/day methodology. The DDD/1000/day values observed in our study are quite different than those observed in other literature. In India a study conducted also shows different DDD values as compared to our study NEW. This is because the duration of the study and sample size is different in each study¹⁹⁻²¹.

CONCLUSION-

This study emphasizes the rationale and appropriate use of antibiotics in the dental practice, there are many field in which the practitioners needs to be educated and have to be made aware of various guidelines.

The following are the outcomes of the study:

- 1.The average number of drugs per prescription should be kept as low as possible to avoid drug interaction, the risk of bacterial resistance, and the cost of treatment.
- 2.The majority of the dentist irrationally used antibiotics.
- 3.Practitioners reported a large number of patients doing self-medication.

4. More drugs prescribed by generic name in private sector.

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