



ANTIBIOTIC UTILIZATION AND PRESCRIBING PATTERNS IN A NIGERIAN UNIVERSITY MEDICAL CENTER

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Abstract

The study of prescribing pattern seeks to monitor, evaluate and suggest a modification in prescriber's prescribing habits so as to make medical care rational and cost effective. Information about antibiotic use pattern is necessary for a constructive approach to problems that arise from multiple antibiotics available. To identify prescribing pattern and antibiotic usage pattern in a Nigerian medical centre. A retrospective study of prescriptions generated within a period of January to December 2006 at the Lagos university medical centre was studied. Core quantitative indicators to measure key aspects of prescribing and the quality of health care developed and tested by WHO Action Program on Essential drugs and the international Network for rational use of drugs was employed. A total of 2909 prescriptions were studied. The average number of drug prescribed per encounter (ANDPE) was found to be 1.53; percentage drug actually dispensed (%DAD) was 84, while average number of antibiotic prescribed per encounter (ANAPE) was 1.28. The percentage encounter with antibiotics (PEA) was 42 while only 2.5% of antibiotic prescribed was based on microbial sensitivity test (MCST). The prescribing habit of the prescribers revealed that 87.5% often prescribed antibiotics. 62.5% base their diagnosis for antibiotic prescription on individual experience and disease prevalent in the community at the time, while 12.5% rely on signs and symptoms on the patient. The antibiotic utilization in the medical centre conforms to a previous study for developing countries on selected core drug use indicators studied retrospectively. The correct knowledge of antibiotic prescribing pattern is evident, but not followed in practice.

Keywords: antibiotics, utilization, prescription patter, medical centre

INTRODUCTION

In 1985 the World Health Organization (WHO) convened a major conference in Nairobi on the Rational Use of Drugs (RUD). Since then efforts have increased to improve drug use practices. An essential tool for such work is an objective method to measure drug use patterns in health facilities that will describe drug use patterns and prescribing behaviours. Medical directors, clinicians as well as policy makers, researchers and

managers collect data to describe patterns of drug use over time. Such measures and indicators, from the data collected and analyzed allow health planners and managers as well as researchers to make basic comparisons between situations in different areas or at different times, thus creating basis for intervention when and where necessary to improve health care delivery. Two basic ways to do this are: (a) Quantitative method which measures what is being done (b)

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Qualitative method which provides reason why it is being done.

Antibiotics represent one of the most widely prescribed forms of drug products and the increasing prevalence of antibacterial resistant pathogens has become well recognized over the years (Srishyla *et al.*, 1994). Existing evidence suggest that there is a casual association between antimicrobial usage in hospitals and antimicrobial resistance (Rogues *et al.*, 2004, De With *et al.*, 2006, Dancer *et al.*, 2006). Also antibiotics are usually costly and unaffordable to some individuals mostly of low socio- economic groups. This adds to economic dimension to the process of developing treatment guidelines and selecting essential drugs. The problem is that once bacteria become resistance to conventional therapy fewer options exist to treat infections. Of the various classes of drugs antibiotic receive special attention as more money is on them than many other drugs (Guglielmo and Brooks, 1989).

Studies on drug utilization pattern especially on antibiotic use and prescribing habit of physicians in developing countries are highly necessary to form a basis for intervention program as maybe needed. However guidelines for rational prescribing are either not available or not effectively implemented in many developing countries. Although several strategies which have been tried, mostly in industrialized countries, to promote rational prescribing has been described (Marr, *et al.*, 1988). These include (i) educational strategies such as printed materials, seminars, bulletins and face to face method, (ii) managerial methods referring to various restrictions on prescribing, (iii) regulatory measures including procedures to evaluate critically drug product information. Hospital formularies and special committees for treatment of infections have also been

reported to be useful in reducing the misuse of drugs (Marr *et al.*, 1988).

Objective

This study aims to evaluate antibacterial prescribing pattern in a Nigerian university health center. Also to assess prescribing habit of the prescribers, with a view to forming a basis for intervention program where needed. This will also serve to promote the rational, safe and cost conscious use of antimicrobial in the health facility, thus improving an aspect of healthcare services.

METHODS

Setting

The health facility used is University of Lagos Medical Center. It is strategically located at the nerve center of Lagos metropolis in the south-south west part of Nigeria. It is a 50-bed hospital in an urban university setting serving students, staff, and staff relations, as well as occasional consultations of outpatients from the environs, especially in emergency cases.

The center serves about 30,000 people annually (adult and children). Medical care was provided by 10 clinicians with 5 – 20 years of experience.

Drug prescribing pattern

Prior to the study, ethical approval was obtained from the institution's relevant body.

A retrospective study of outpatient prescriptions generated from a period of January to December 2006 was carried out. Samples of prescriptions were randomly selected quarterly sufficient sample size. From the prescriptions the ones with antibacterial agents were separated and the following data extracted:

1. No. of drugs on each prescription
2. No. of out of stock (o/s) drug

3. No. of antibiotics on the prescription
4. Dose and duration of antibiotic prescribe to ensure for appropriate prescribing according to guideline

The case notes of the selected prescriptions were later referred to, to check for

- i. Indication for the antibiotic
- ii. Sensitivity test carried out for the antibiotic prescribed.

The data were coded, entered and processed on an IBM – PC compatible computer.

The WHO Action Program on Essential Drugs and the International Network for the Rational Use of Drug (APED/INRUD) developed and tested on 12 core quantitative indicators to measure some key aspects of drug use and the quality of health care, was employed. Detailed information about the application of the indicators to investigate drug use in health facilities is found in WHO manual (WHO, 1993). Indicators of drug use employed in this study include:

- (a) Average number drugs prescribed per encounter (ANDPE)
- (b) Percentage drug actually dispensed (%DAD).
- (c) Percentage encounter with antibiotics (PEA)
- (d) Average number of antibiotics per encounter (ANAPE).
- (e) Percentage of antibiotics based on microbial sensitivity test (MCST).

In addition a survey on the prescribing habit of the prescribers was performed using a structured pre – tested questionnaires. Indicators of prescribing quality employed include:

- (f) Availability and use of hospital drug list
- (g) Use of reference materials
- (h) Knowledge of antibacterial prescribing process.

Other additional prescribing information obtained include

- (i) Frequency of prescribing antibiotics
- (ii) Condition for which antibiotics are prescribed
- (iii) Preferred dosage form of antibiotic administered

A total of 10 prescribers (physicians) were administered with the questionnaires. Eight (8) of them returned the completed questionnaires.

RESULTS

Tables I and II show results of the data from collected prescriptions and the results of prescribing indicators, respectively.

Table I: Data obtained from the prescriptions generated from January to December 2006

Total no. of prescriptions	2909
Total no. of prescriptions with antibacterial agents	1228
Total no. of drugs on the prescription	4468
Total no. of out of stock drugs (drugs not dispensed)	714
Total no. of sensitivity test carried out for antibacterial prescribed	30
Total no. of antibacterial prescribed	3775

Table II: Results of prescribing indicators

Average no. of drugs prescribed per encounter (ANDPE)	1.53
% Drug Actually dispensed (%DAD)	84%
Percentage encounter with antibiotics	42.2%
Percentage antibiotics based on sensitivity test	2.5%

(MCST)	
Average no. of antibiotic per encounter	1.28

Table III: Antibiotic prescribing habit of the prescribers

	Frequency	% Frequency
Use of hospital drug list for prescribing	4	50%
None usage of hospital drug list for prescribing	3	37.5%
No knowledge of hospital drug list	1	12.5%
Use of reference material for prescribing		
BNF	7	87.5%
MIMS	8	100%
Medipharm	0	0
Nigerian drug list	0	0
Text books	3	37.5%
Company drug leaflets	1	12.5%
Prescriber's basis of diagnosis for prescribing antibiotics		
Based on individual experience	5	62.5%
Based on superior's experience	2	25%
Based on laboratory test result	8	100%
Based on disease prevalent in the community	5	62.5%
Based on signs and symptoms on	1	12.5%

the patient		
Based on reference material	1	12.5%

Table IV: Additional prescribing habit

Prescriber's frequency of prescribing antibiotics	Frequency	% Frequency
Very often	1	12.5%
Often	7	87.5%
Rarely	0	0
Never	0	0
Conditions for which antibiotics are prescribed		
Cough	1	12.5%
Skin infection	0	0
Malaria	0	0
Boil	4	50%
UTI	7	87.5%
Diarrhea	0	0
Typhoid fever	6	62.5%
Pneumonia	8	100%
Preferred dosage form of administration of antibiotic		
Syrup	6	62.5%
Table/capsule	7	87.5%
Injection	1	12.5%
Infusion	1	12.5%
Topical application	0	0

DISCUSSION

Monitoring systems have been reported to be useful in improving the quality of health care in many countries and interventions have been shown to change drug use indicators and other indicators (WHO, 1993; Hogerzeil *et al.*, 1993). Attempts have been made by World Health Organization (WHO) through International Network of Rational Use

of Drug (INRUD) and Department of Essential Drugs and Medicines Policy (DEMP) to monitor and improve the use of antibiotics through prepared guidelines on the rational use of drugs and Essential Drug Concept.

There is concern over the increased use of antibiotics with its attendant consequence which is development of resistance strains of microorganisms as well as increase in health care cost (Kunin, 1979). This study made to review antibiotic utilization in Lagos university health facility showed the results conform to the earlier work reported on selected drug use indicators for developing countries (Marr *et al.*, 1988; Hogerzeil *et al.*, 1993). The average number of drugs per encounter (ANDPE) is an important index of the scope for review and educational intervention in prescribing practice (Shanker *et al.*, 2004). In this study the ANDPE obtained is 1.5 which is less than 3.8 reported for Nigeria in a field test study and still less than 3.16 reported for a Nigeria general hospital (Chukwuani *et al.*, 2002). This may be possibly attributed to less patient pressure and higher patient consultation time in the health center. The prescription of less number of drugs per encounter has the advantage of reduced potential drug interaction, prescription error and polypharmacy.

The percentage of drugs actually dispensed (%DAD) from our study is 84%, and percentage encounter with antibiotic (PEA) is 42.2% which falls within the values reported for other developing countries (WHO, 1993). The high percentage of drug actually dispensed, maybe an indication of proper drug management system within the health center or due to improved financial support for the facility.

The antibiotic prescribing pattern of the respondents shows that 50% use hospital drug list for prescription while all prescribers consult MIMS followed by BNF as reference material, and none use Nigerian drug list. The non-usage of the Nigerian drug list maybe due to unavailability of the national drug list or lack of confidence in the list. This obviously has its implication in the National health policy which promotes local production of drugs and cost effective treatment.

Although all the respondents affirmed to the correct knowledge of antibiotic prescribing pattern, the implementation does not follow the course as only 2.5% of the prescribed antibiotics were based on microbial sensitivity tests. This trend in habit maybe attributed to high consultation time which Nigeria was reported to be highest with 6.3 minutes compared with other countries (WHO, 1993). It may also be attributed to high patient: physician ratio or total treatment cost, or further still to level of treatment outcome

The unavailability of drug and therapeutic committee in the medical center may have exposed the prescribers to rely more on their experiences than definite guidelines on drug list or adopting clinical guidelines for prescribing antibiotics.

CONCLUSION

The retrospective study of antibiotic utilization pattern in Lagos university medical centre conforms to WHO values for Nigeria on the selected drug use indicators, with variation in the average number of drug per encounter (ANDPE). However, there is need for prospective study and also to put in place drug and therapeutic committee to establish and monitor guidelines on rational use of drug in the medical centre. Intervention program involving

continue education programs /seminars maybe necessary for total adherence to proper antibiotic prescribing habit (PAPH).

REFERENCES

- Chukwuani CM, Onifade M and Sumonu K. (2002) Survey of drug use practices and antibiotic prescribing pattern at a hospital in Nigeria. *Pharmacy World and Science* 24 (5): 188- 195
- Dancer SJ, Coyne M, Robertson C, Thomson A, Guleri A, and Alcock S. (2006): Antibiotic use is associated with resistance of environmental organism in a teaching hospital. *J Hospital Infect* 62: 200-206
- De With K, Meyer E, Steib-Bauert M, Schwa M, Daschner FD, and Kern WV (2006): Antibiotic use in cohort of German intensive care units. *J Hospital Infect* 64: 231 -237
- Guglielmo BJ, Brooks GF (1989): Antibiotic therapy. Cost- benefits consideration. *Drugs* 38: 473 - 80
- Hogerzeil HV, Bimo , Ross-Degnan D, Laing RO, Ofori- Adjei D,Santoso B, Azad Chowdhury AK, Das AM, Kaffle KK, Mabadeje AF. (1993): Field test for rational drug use in twelve developing countries. *Lancet* 342 (8884) Dec 4) : 1408 -10
- Kunin CM. (1979): Antibiotic Accountability. *New Engl J Med* 301: 380- 1
- Marr JJ, Moffet HL, Kunin CM. (1988): Guideline for improving the use of antimicrobial agents in hospitals : A statement by the Infectious Disease Society of America. *J Infect Disease* 157: 869 -76
- Rogues, AM, Placet-Thomazeau, B, Parneix , P, Vincent I, Ploy,MC and Marty, N, et al (2004): Use of antibiotics in hospitals in South-Western France. *J. Hospital Infect.* 58: 187-192
- Shankar pr, Kumar P, Rana MS, Partha P, Upadhyay D, Dubey AK. (2004): Morbidity profile and drug utilization in a sub-health post in Western Nepal. *Calicut Medical J* 2 (4): e4.
- Srishyla MV, Naga R, Venkataraman BV, (1994): Drug utilization of antimicrobials in the in -patient setting of tertiary hospital. *Indian J Pharmacol* 26: 282-287
- World Health Organization Action Program on Essential Drugs. How to investigate drug use in facilities: Selected drug use indicators. Geneva World Health Organization 1993 (WHO/DAP/93.1)