ASSESSMENT OF PRESCRIBING PATTERNS OF QUINOLONES IN A TERTIARY HEALTH INSTITUTION

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Abstract

Irrational and inappropriate drug use is a major concern in developed and developing countries. Appropriate drug utilization studies are important to evaluate drug utilization in terms of efficacy, safety and cost. The objective of this study was to assess the rational prescribing of quinolones in a tertiary health institution with respect to age, dosage, duration, diagnoses treated, economic implications, generic prescribing, and most commonly prescribed quinolones.

This was a retrospective study involving 403 prescriptions that had quinolones at the general out-patient department of Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State between January 2006 and December 2007.

Patients within 21-30 years of age had the highest percentage (27.1%), those less than 18 years had 5.1% while those above 70 years had 4.4% of the prescribed quinolones. Ciprofloxacin was the most commonly prescribed (74.5%) at twice daily dose for seven days duration although it was prescribed in its branded name. The disease most frequently treated included respiratory tract infections (26.8%) while the least was peptic ulcer disease (4.9%). This study found appropriateness of quinolones use in this health facility with regards to diagnosis treated, dose, duration and not being used in pregnant women. But some forms of irrational drug prescribing were found in the areas of prescribing for 5.1% of children less than 18 years. Also some of the drugs were prescribed with their brand names and this is not encouraged in rational drug prescribing. Strict rational drug prescribing should be encouraged to avoid adverse effect, non adherence and drug resistance in this hospital.

Key words: Quinolones, rational prescribing, Tertiary health institution.

INTRODUCTION

In the pre-antibiotic era, infectious diseases accounted for significant morbidity and mortality and invasive medical procedures were fraught with the risk of infections. All these changed with the accidental discovery of the first antibiotic by Alexander Fleming in 1928 which revolutionized the therapy of infections, and saved millions of lives (Kendall, 1994). But the miracle seemed to be short lived due to irresponsible and erratic use of these life-saving drugs and this had also resulted in the development of drug resistance in many organisms and deaths arising from nosocomial infections are on the increase. Currently, antimicrobials are the most widely used category of drugs in the world accounting for over one-quarter of hospital drug costs (Smith *et al.*, 1991). Studies have revealed the existence of compulsive antibiotic prescribing all over the world (Swindell *et al.*, 1983). Another study carried out in USA found that 51% of patients with colds and URTI were

receiving antibiotics and estimated that over 20% of all antibiotic prescriptions were clinically useless (Gonzales *et al.*, 1997).

Therefore, irrational or inappropriate use of drugs is a major concern in both developed and developing countries (Hogerzel, 1995; Joshi, 1996). The cost of irrational use of medicines is enormous in terms of scarce resources and adverse clinical consequences of therapies that may have real risk but no objective benefits. The term 'inappropriate' and 'irrational' are often used interchangeably. The drugs chosen may not be appropriate to the patients, the diagnosis, economic status etc. The conference of experts on the rational use of drugs convened by the WHO in Nairobi in 1985 stated that "Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time and at the lowest cost to them and their community" (WHO, 1985).

Inappropriate use and over-use of medicines wastes resources often, out-of-pocket payments by patients and results in significant patient harm in terms of poor patient outcome and adverse drug reactions. Also, irrational over-use of medicines can stimulate inappropriate patient demand and lead to reduced access and attendance rates due to medicines stock-out and loss of patient confidence in the health system.

A 2003 article by Ronning *et al*. reviewed antibacterial usage in 16 European countries. The study demonstrated that the antibiotic use was higher than required, largely irrational and generally empirical. The comparative figure for Nigeria in antibiotic utilization studies as per percentage of prescriptions involving antibiotics was 48% and this can be considered low when compared with Jordan (61%) and Sudan (63%) (WHO, 1993; Tomson *et al.*, 1990;

Krause, 1999). According to figures gathered by surveys presented to WHO in 2000, about 60% of antibiotics use in Nigeria is prescribed unnecessarily.

Many initiatives have been launched in order to rectify the situation. The International Network for Rational Use of Drugs (INRUD) (WHO, 1993) is one such program which has been working since 1989 to identify the best ways of improving the use of drugs and to disseminate these findings to improve the ways "drugs are prescribed, dispensed, and used, with particular emphasis on resource poor countries".

The main objective of this study was to assess rational prescribing of quinolones in a tertiary health institution while the specific objective was to assess the prescribing modalities in terms of age, dosage, duration, diagnosis treated, economic implications, generic prescribing and the most commonly prescribed quinolones.

MATERIALS AND METHODS

Research location
This was a descriptive study carried out at Olabisi Onabanjo University Teaching Hospital, Sagamu, (OOUTH), a state government owned tertiary hospital in Ogun State in the South- Western part of Nigeria.

Study design
It was a retrospective study involving 403 prescriptions of patients that had quinolones at the General Out-Patient Department (GOPD) of the hospital between January 2006 and December 2007. Patients' case notes were retrieved from the medical record department and a data collection form designed and pre-tested by the author was used for data collection.

Data extracted included age of patients, percentage, and type of quinolones prescribed for patients,

diagnosis treated, quinolones prescribed by generic names and the most commonly prescribed quinolones which were carefully entered into the form.

Ethical issues
Approval to carry out this research was obtained from the authority of the Olabisi Onabanjo University Teaching Hospital, Sagamu before the commencement of the study.

Data analysis
The data collected were entered into Microsoft Excel (Microsoft Inc, USA) and double checked for accuracy. Descriptive statistics was used in the presentation of data as appropriate.

RESULTS
Patients within 21-30years of age had the highest percentage (27.1%), 31-40years (21.6%), 51-60years (14, 4%), those less than 18 years (5.1%) while those above 70 years had the least (4.4%) of the prescribed quinolones (Table 1). Ciprofloxacin (500mg) was the most commonly prescribed (74.5%) at twice daily dose for seven days duration although it was mostly prescribed in its branded name, followed by Norfloxacin (8.2%), perfloxacin (6.7%), sparfloxacin (5.9%) and ofloxacin (4.7%). Sparfloxacin (400mg), pefloxacin (400mg) and ofloxacin (200mg) were usually prescribed for between 3-7days duration (Table 2). The disease states that were most frequently treated included respiratory tract infections (26.8%), asthma and plasmodiasis (12.9% each), subacute appendicitis (11.2%), pelvic inflammatory disease (10.4) and pulmonary tuberculosis (6.2%) (Table 3).

DISCUSSION
This study found appropriateness of quinolones use in this health facility with regards to dose, duration, diagnoses treated, and not being used in pregnant women. But some forms of irrational drug prescribing were found in the areas of prescribing for 5.1% of children less than 18 years during the period under review. Also some of the drugs were prescribed with their brand names which is not encouraged in rational drug prescribing. Quinolones are not recommended for use in children and adolescents younger than 18 years of age, or in pregnant or breastfeeding women because they have been associated with arthropathy and chondrotoxicity in immature animals (Hackbarth, 1986; Walker, 1999). Therefore, prescribing quinolones for this set of patients constituted irrational prescribing while their not being prescribed for pregnant and nursing women can be said to be of strict adherence to WHO guidelines for rational drug use.

Recently, fluoroquinolones are being blamed for multiple adverse effects which may be long lasting and in addition, development of resistance and super infection may result from overuse or prolonged administration. The most common adverse effects included nausea, vomiting, and diarrhoea which occurred in 3 to 6 percent of recipients (Fitton, 1992).

The use of fluoroquinolones in this study was mainly in the treatment of respiratory tract infections which agrees with Borcherding *et al.* (1996) who also found them effective in a wider variety of infectious diseases including skin and respiratory infections.

Ciprofloxacin (500 mg) was the most commonly prescribed but this was done using its branded name instead of generic name. Ciprofloxacin became the most frequently used antibiotic throughout the world shortly after the introduction of the fluoroquinolones in the late 1980s (Norrby, 1993) and this has led to its overuse. The use of brand names is not encouraged in rational drug prescribing because of cost

implications of the drugs which must be borne in mind as this can lead to problems of patient non adherence. The World Health Organization (WHO) has come out with an Essential Drug List (EDL) of 250 preparations[7] as a guide to prescription appropriateness. Prescribing drugs in generic forms will likely halve their costs and increase their availability in health centres.

CONCLUSION
Quinolones use in this facility can be said to be rational in some areas but irrational in others. Broad-spectrum antimicrobial

Table 1: Age distribution and frequency of quinolones prescribed for patients

Age-group (years)	YEAR 2006 Frequency (%)	YEAR 2007 Frequency (%)	**Total** **Frequency (%)**
< 18	9 (2.2)	12 (2.9)	21 (5.1)
18 – 20	5 (1.2)	13 (3.2)	18 (4.4)
21 – 30	70 (17.4)	39 (9.7)	109 (27.1)
31 – 40	54 (13.4)	33 (8.2)	87 (21.6)
41 – 50	26 (6.5)	26 (6.5)	52 (13.0)
51 – 60	32 (7.9)	26 (6.5)	58 (14.4)
61 – 70	21 (5.2)	15 (3.7)	36 (8.9)
> 70	14 (3.5)	8 (2.0)	22 (5.5)
Total	231 (57.3)	172 (42.7)	403 (100)

Table 2: Distribution and frequency of quinolones prescribed

	Quinolones	Year 2006 Frequency (%)	Year 2007 Frequency (%	Total (%) Frequency (%)
1.	Ciprofloxacin	149 (37.0)	151 (37.5)	300 (74.5)
2.	Ofloxacin	15 (3.7)	4 (1.0)	19 (4.7)
3.	Sparfloxacin	18 (4.4)	6 (1.5)	24 (5.9)
4.	Pefloxacin	24 (6.0)	3(0.7)	27(6.7)
5.	Norfloxacin	25 (6.2)	8 (2.0)	33(8.2)
	Total	231 (57.3)	172 (42.7)	403 (100)

Table 3. Common diagnoses treated with quinolones at G.O.P.D, O.O.U.T.H between 2006 and 2007

Diagnoses	*Year 2006* Frequency (%)	*Year 2007* Frequency (%)	**Total (%)** Frequency (%)
Plasmodiasis	34 (8.4)	18 (4.5)	52 (12.9)
Asthma	22 (5.5)	30 (7.4)	52 (12.9)
Pelvic Inflammatory disease (PID)	29 (7.2)	13 (3.2)	42 (10.4)
Peptic ulcer disease (PUD)	9 (2.2)	11 (2.7)	20 (4.9)
Respiratory tract infections (RTI)	55 (13.6)	53 (13.2)	108 (26.8)
Subacute appendicitis	33 (8.2)	12 (3.0)	45 (11.2)
Typhoid fever	20 (5.0)	9 (2.2)	29 (7.2)
Urinary tract infections (UTI)	14 (3.5)	16 (4.0)	30 (7.5)
PTB	15 (3.7)	10 (2.5)	25 (6.2)

PTB = Pulmonary tuberculosis

UTI = Urinary Tract Infection

RTI = Respiratory Tract Infection

PUD = Peptic Ulcer Disease

agents should not be used empirically and indiscriminately for all infections in order to forestall the development of resistant organisms which are often very difficult to treat.

Generic prescribing should be encouraged to enhance drug availability, affordability, and patients' adherence. In general, periodical evaluation of prescribing patterns is a necessity which can be employed to increase therapeutic efficacy, decrease adverse effects, avoid unnecessary increase in the cost of health care, and provide feedback to prescribers in heath facilities.

There is therefore an urgent need to enforce the Essential Drug List of the WHO in public as well as private medical practice. The Government must take the lead by purchasing generic drugs for hospitals and peripheral health outlets.

REFERENCES

Borcherding SM, Stevens R, Nicholas RA, Corley CR, Self T. Quinolones: a practical review of clinical uses, dosing considerations, and drug interactions. J Fam Pract. 1996:42; 69-78.

Fitton A. The quinolones. An overview of their pharmacology. Clin Pharmacokinet 1992: 22(suppl 1); 1-11

Gonzales R, Steiner JF, Sande MA. Antibiotic prescribing for adults with colds, upper respiratory tract infections, and bronchitis by ambulatory care physicians. Jam Med Assoc 1997: 278(11); 901-4.

Hackbarth CJ, chambers HF, Sande MA Serum bactericidal activity of rifampicin in combination with other anti-microbial agents against staphylococcus aureus. Antimicrobial

Agents chemother 1986: 29; 611-3.

Hogerzel HV. Promoting rationale prescribing an international perspective. Br j clin pharmacol 1995: 39;1-6.

Joshi MP. Rational prescribing. In Josh MP, A dhikari RK, eds. Manual of drugs and therapeutic. Kathmandu: Health learning materials center 1996:1-10.

Kendall F. Haven Marvels of Science (Libraries Unlimited, 1994): p182.

Krause G . Rationality of drug prescriptions in rural health centers in Burkina Faso. Health Policy and Planning 1999: 14; 291–8.

Norrby SR, Lietman PS. Safety and tolerability of fluoroquinolones. Drugs 1993:45(suppl 3); 59-64.

Ronning M et al. Problems in collecting comparable national drug use data in Europe: the example of antibacterials. Berlin, Springer-Verlag 2003.

Smith AJ, Aronson JK, Thomas M. Antibiotic policies in the developing world. Euro J Clinical Pharmacol. 1991: 41; 85-87.

Swindell PJ, Reevs DS, Bullock DW, Davies AJ, Spence CE. Audit of antibiotic prescribing in a Bristol hospital. British Medical Journal 1983: 286; 118-122.

Tomson G, Diwan V, Angunawela I. Paediatric prescribing in out-patient care. An example from Sri Lanka. Euro J Clinical Pharmacol, 1990: 39; 469–73.

Walker RC. The fluoroquinolones. Magclin Proc 1999: 14; 1030-7

WHO Action Programme on Essential Drugs and Vaccines. How to investigate drug use in health facilities: selected drug use indicators. Geneva, World Health Organization, 1993.

World Health Organization, The Rational use of Drugs. Report of the conference of Experts. Geneva: WHO, 1985.