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# Co-trimoxazole Prescription at the Outpatient Service of a Secondary Health Facility in Ibadan, Nigeria

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Malaria and respiratory tract infection sometimes co-exist compelling use of antibacterial and antimalarial drugs. Assessment of prescribing patterns avails us the opportunity of monitoring and if necessary, suggest modifications in prescribing practices of medical practitioners so as to make medical care rational and cost effective. A retrospective assessment of pattern of prescription at a government owned secondary health facility. The age, sex, the drugs prescribed to each patient were recorded and prescriptions involving cotrimoxazole were further analyzed. Antibacterial drugs were commonly prescribed being more commonly prescribed for male than female patients. Cotrimoxazole prescription accounted for about 1% only of the total 18075 and 6% of all antibacterial drugs used but was used in about 30% of all cases of respiratory tract infections requiring antibacterial drugs. Misuse of antibacterial agents and irrational drug combinations are not uncommon, there is need for regular education amongst health care providers in our area of study.

**Key words:** Chemotherapy, cotrimoxazole, malaria, infections, *Plasmodium falciparum*, *Pneumocystis carinii*

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## INTRODUCTION

The overall goal of chemotherapy of infectious diseases is to eliminate invading organisms with minimal or no unwanted effect on the host. In Nigeria, commonly prescribed antibacterial agents include the penicillins, the macrolides, the quinolones, the cephalosporins, the aminoglycosides, metronidazole, cotrimoxazole and the tetracyclines. Apart from being an antibacterial agent, cotrimoxazole, a synergistic combination of two antifolate drugs, has proven efficacy in the treatment of protozoan diseases like *Plasmodium falciparum* and *Pneumocystis carinii* infections (Fasan, 1971; Fehintola *et al*., 2002; Bloland *et al*., 1991; Gleckman *et al*., 1979). Both respiratory tract infections and malaria are very common conditions in sub-Saharan Africa and together responsible for about 50% of childhood morbidity and mortality in the area. In view of the efficacy of cotrimoxazole in the treatment of *Plasmodium falciparum* infection and the advocacy for combination chemotherapy in its treatment, there is need to assess the pattern of prescription involving this drug in an area that is hyper-endemic for malaria. The aim was to evaluate the use of this drug in a secondary health facility, indications for its use and assess possible unwanted effects ascribable to the drug. We concluded that cotrimoxazole is relatively commonly used in the treatment of respiratory tract infections at a secondary health facility in Ibadan, South-west Nigeria

## MATERIALS AND METHODS

In Nigeria, formal health care delivery operates at three levels namely, primary, secondary/general and tertiary/specialist hospitals. While the primary health facilities aggregately attend to more patients and exist throughout the country there was a dearth of health professionals and such a facility can only handle minor medical conditions. The tertiary/specialist facilities serve as the highest level of health care, providing patient care as well as training and research. The secondary health facility is intermediate and also has training facilities for middle level health care providers including nurses.

The study was conducted at Jericho General Hospital, Ibadan; a government owned secondary health care facility.

The hospital caters for medical needs of patients, mainly adults. Only few children were seen as a hospital established for taking care of children is situated about 1.5 km from this hospital.

The case record form consists of card-boards usually stapled together for any particular patient. Patients' information including history, physical and laboratory findings and prescriptions were written on these cards. Once consultation was completed these case record forms were sent to the Pharmacy Department of the Hospital where the prescribed drugs were dispensed.

We evaluated all prescriptions for patients who attended out-patients clinics of this general hospital for a period of 12 months. The patients' records were assessed for age, sex, number and names of drugs prescribed and indications for such prescriptions. Incidences of multiple prescriptions involving co-trimoxazole and findings at subsequent follow-up of patients were also evaluated. All the information obtained was recorded in a format specially prepared for that purpose.

Data analysis was carried out using EPI-INFO version 6 (Anonymous, 1994). Proportions were compared using $\chi^2$-tests while students t-test was used for continuous variables. Level of statistical significance was set at $p<0.05$.

## RESULTS

The total number of prescriptions assessed in the 12 months' period was 4,596. Of these 1,691 and 2,905 prescriptions were for male and female patients, respectively. The total number of drugs prescribed was 18,075 drugs. The total number of drugs prescribed for males and females being 6,861 and 11,214, respectively (Table 1). The mean numbers of drugs per prescription for males was 3.81±1.56 (range 1-7) and for females 3.92±1.53 (range 1-7) drugs. The mean age of female patients was 31.84±14.38 (6-80) and males 32.46±17.11 (3-85) years. Children aged less than 15 had only 387 or 8.42% of all the prescriptions and 1686 or 9.33% of all drugs. There were similarities between the children population and adult in respect of distribution of various drugs such that in both population antimicrobial as well as analgesic/antipyretic drugs were commonly prescribed.

The proportion of analgesics/antipyretics was found to be 23.8%. While the proportions for antibacterial,

Table 1: Frequency distribution of various drugs prescribed compared between males and females (proportions are indicated in parenthesis)

| | Male | Female | Total | Statistics |
|---|---|---|---|---|
| NSAIDs/Analgesics/ Antipyretic | 1676 (24.4) | 2624 (23.4) | 4300 (23.8) | $\chi^2$: 2.48 $p$>0.11 |
| Antibacterial | 1213 (17.7) | 1611 (14.4) | 2824 (15.6) | $\chi^2$: 35.45 $p$<0.00 |
| Antimalarial (e.g., chloroquine, artesunate, sulphadoxine plus pyrimethamine, etc. | 921 (13.4) | 1560 (13.9) | 2481 (13.7) | $\chi^2$: 0.05 $p$>0.35 |
| Others including: psychoactive, cardioactive, antiulcer antiviral anti-asthma and anti-diabetic drugs. | 3051 (44.5) | 5419 (48.3) | 8470 (46.9) | $\chi^2$: 48.32 $p$<0.00 |
| Total | 6861 (38.0) | 11214 (62.0) | 18075 | |

Table 2: Choice of antibacterial agents in the treatment of respiratory tract infection compared with other indications at Jericho General Hospital, Ibadan, Nigeria (proportions are indicated in parenthesis)

| Antibacterial drug | Respiratory tract infections (N=331) | Other indications (N=2493) | All indications (N = 2824) |
|---|---|---|---|
| Cotrimoxazole | 101 (30.5) | 86 (3.4) | 187 (6.2) |
| Penicillins | 107 (32.3) | 690 (27.7) | 797 (28.2) |
| Quinolones | 50 (15.1) | 465 (18.7) | 515 (18.2) |
| Others | 73 (22.1) | 1252 (50.2) | 1325 (46.9) |

Table 3: Commonly prescribed drugs with co-trimoxazole at the Jericho General Hospital, Ibadan, Nigeria

| Concomitant drug | Frequency | Indication |
|---|---|---|
| Analgesic/Antipyretics | 153 | Malaria, RTI, Uterine fibroid, trauma, laceration/bruise, pain |
| Antibiotics/Antibacterial | 50 | UTI, RTI, PUD, Amoebiasis |
| Antimalarials including: chloroquine, pyrimethamine-sulphadoxine, artesunate | 112 | Malaria, RTI, UTI |
| Others including: vitamins, cardioactive, antiulcer, anti-asthma, antidiabetic drugs etc. | 186 | Malaria, RTI, UTI, PUD, schistosomiasis, mastitis, scabies |

RTI: Respiratory Tract Infection, UTI: Urinary Tract Infection, PUD: Peptic Ulcer Disease

antimalarial and other drugs were 15.6, 13.7 and 46.9%, respectively. The proportions of analgesics/antipyretic prescribed for male and female were 24.4 and 23.4%, respectively. Prescriptions for antibacterial agents were proportionately more for males than females: 1213/6861 (17.7%) versus 1611/11214 (14.4%), respectively; $\chi^2$: 35.45 p<0.00 (Table 1). Of all the prescriptions for antibacterial agents, 797 (28.2%) were penicillins, 515 (18.2%) the new generation quinolones and 604 (21.4%) metronidazole. Cotrimoxazole was prescribed in 187 instances only or approximately 1% of all the drugs or about 6.2% (187/2824) of all antibacterial agents documented in this study. However, cotrimoxazole was prescribed in 101/331 (30.5%) cases of respiratory tract infections requiring antibacterial agents. The penicillins were used in 107/331 (32.3%), quinolones in 50/331 (15.1%) and other antibacterial agents were used in the remaining 73 or 22.1% of cases (Table 2).

Cotrimoxazole was prescribed for respiratory tract infections in 54% of all the indications for its use whereas penicillins were used for similar purpose in only 107/797 (13.4%), the quinolones in 50/515 (9.7%) and the other antibacterial agents in 73/1325 (5.5%) of all indications. Co-existence of respiratory tract infections and malaria were responsible for 94/187 (50.3%) whereas only in 18 cases were antimalarial drugs and cotrimoxazole co-prescribed for other indications. Cotrimoxazole was co-administered with analgesic/antipyretic drugs in 153/187 (81.8%) or other antibacterial 50/187 (26.7%), (Table 3). In most cases of antimalarial and cotrimoxazole co-prescription, chloroquine, 70/112 (62.3%) or artemisinin derivatives or combinations 19/112 (17.0%) were used but in 5/112 (4.5%) antifolate antimalarial drugs were co-prescribed with cotrimoxazole. In the remaining 18 cases amodiaquine (13), halofantrine (2) or mefloquine (3) were the antimalarials used.

The means age of female and male who received cotrimoxazole were respectively, 30.76±13.73 (11-60) and 32.48±17.11 (11-83) years, F = 0.57, p: 0.45. Of the total 1691 prescriptions received by males 71 (4.20%) were for cotrimoxazole. Also females received cotrimoxazole 116 (4.0%) occasions of a total of 2905 prescriptions, $\chi^2 = 0.12$, p: 0.73).

## DISCUSSION

In a tropical environment like ours, most hospitals attendees commonly present with infectious diseases. Inflammatory conditions like osteoarthritis and/or rheumatologic disorders in addition to infectious diseases do require anti-inflammatory/antipyretic agents. It is therefore understandable why most of the prescriptions encountered were for these two classes of drugs. Male and female patients were well represented and both received similar profile of drugs during the period under review.

The prescriptions as revealed in this study were rather skewed such that a lot more prescriptions were for adults. The foregoing is due to the fact that only few of the children requiring attention would present in this hospital as a separate children hospital is situated nearby. There were similarities between the children population and adult in respect of distribution of various drugs such that in children and adults antimicrobial as well as analgesic/antipyretic drugs were commonly prescribed. A good proportion of antimicrobial prescriptions were for treatment of either bacterial infections or malaria. It was noteworthy that proportionately more males received antibacterial drugs than females. One explanation for this observation may be attitude of an average male Nigerian to hospital attendance such that they are wont to attend hospitals for relatively serious illnesses.

Chloroquine was the most commonly prescribed antimalarial drug being the first-line antimalarial drug until recently when drug resistance became widespread (White, 1999; Spencer, 1985; Wernsdorfer, 1991). Co-trimoxazole is an antifolate antibacterial agent consisting of sulphamethoxazole and trimethoprim. It has proven antimalarial effect though it was never approved for such purpose in Nigeria. Compared to other antibacterial

agents cotrimoxazole was prescribed in only 1% whereas penicillins, quinolones and metronidazole were prescribed in 4.4, 2.8 and 3.3% of all the drugs for the period of review. On the other hand cotrimoxazole seemed a choice drug in the treatment of respiratory tract infections relative to other antibacterial agents. The ease of administration, cost and availability are possible reasons for this. Similar findings were noted by Akingbade and Odedokun (Akingbade and Odedokun, 1995). The drug was prescribed for similar proportions of males as well as females and in all except one case with other drugs notably other antimicrobials including antimalarials and antipyretic/analgesics drugs.

It is of especial note that malaria coexisting with respiratory tract infections was the commonest indication for prescribing the two classes of drugs together. Co-trimoxazole was sometimes prescribed with sulphadoxine-pyrimethamine and this may be irrational drug use as the mechanism of action of both drugs is similar (Milhous *et al*., 1985) and are equally efficacious in the treatment of malaria (Fehintola *et al*., 2004).

In this era of combination chemotherapy for the treatment of falciparum malaria the use of co-trimoxazole together with other antimalarial drugs than antifolate antimalarials may be encouraged. Indeed such practice in the past might have provided superior efficacy in the treatment of otherwise drug-resistant strains of *Plasmodium falciparum* infection. Perhaps, this surreptitious use of combination chemotherapy might have delayed the development and spread of drug resistance in *Plasmodium falciparum*.

One is not unmindful of adverse drug effects ascribable to cotrimoxazole. However, these adverse reactions may not be more common or serious than with other commonly used drugs for similar purpose. There was no record of unwanted effects with any of the patients who received cotrimoxazole in this study. We know this does not necessarily mean the absence of adverse reactions as patients might not have volunteered the information or doctors did not ask and/or document same.

In conclusion, co-trimoxazole and other antimicrobial drugs were commonly prescribed in government owned Jericho general Hospital in Ibadan, Nigeria. The recently released 2004 Nigeria National Policy for Malaria treatment recommends Artemisinin-based Combination Therapy (ACT) for the treatment of malaria. It may be appropriate to conduct prospective clinical trials of artemisinin-based combination using co-trimoxazole as one of the combination drugs. This is in view of the fact that the drug is relatively inexpensive, easy to administer and has previously been found to be well tolerated (Gleckman *et al*., 1979; Campbell *et al*., 1998).

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